

Artificial General Intelligence

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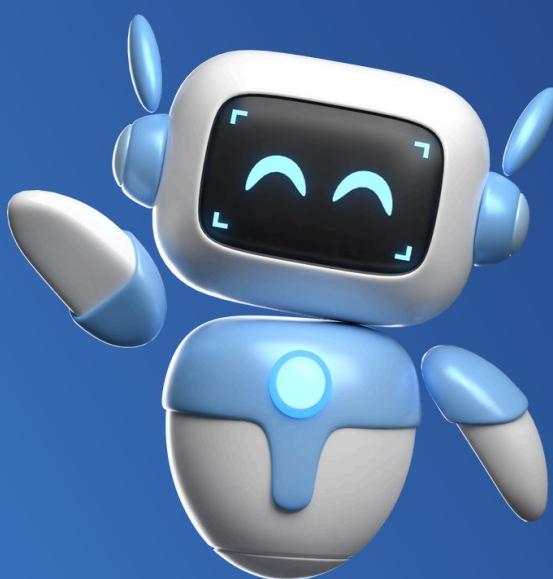
SECTION 6

POST AGI WOLD
POST AGI ECONOMICS





What Is AGI ?



Artificial General Intelligence (AGI) refers to an artificial system that can exhibit intelligence comparable to that of humans

AGI encompasses the ability to reason, learn, adapt, and apply knowledge across various domains.

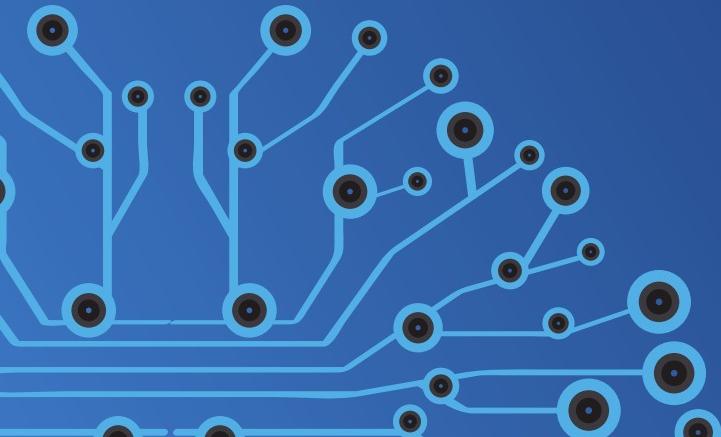
AGI is considered to be strong artificial intelligence (AI).



Why Do We Need AGI ?

- Automation of Complex Tasks
- Research & Analysis
- Solve problems, humans couldn't

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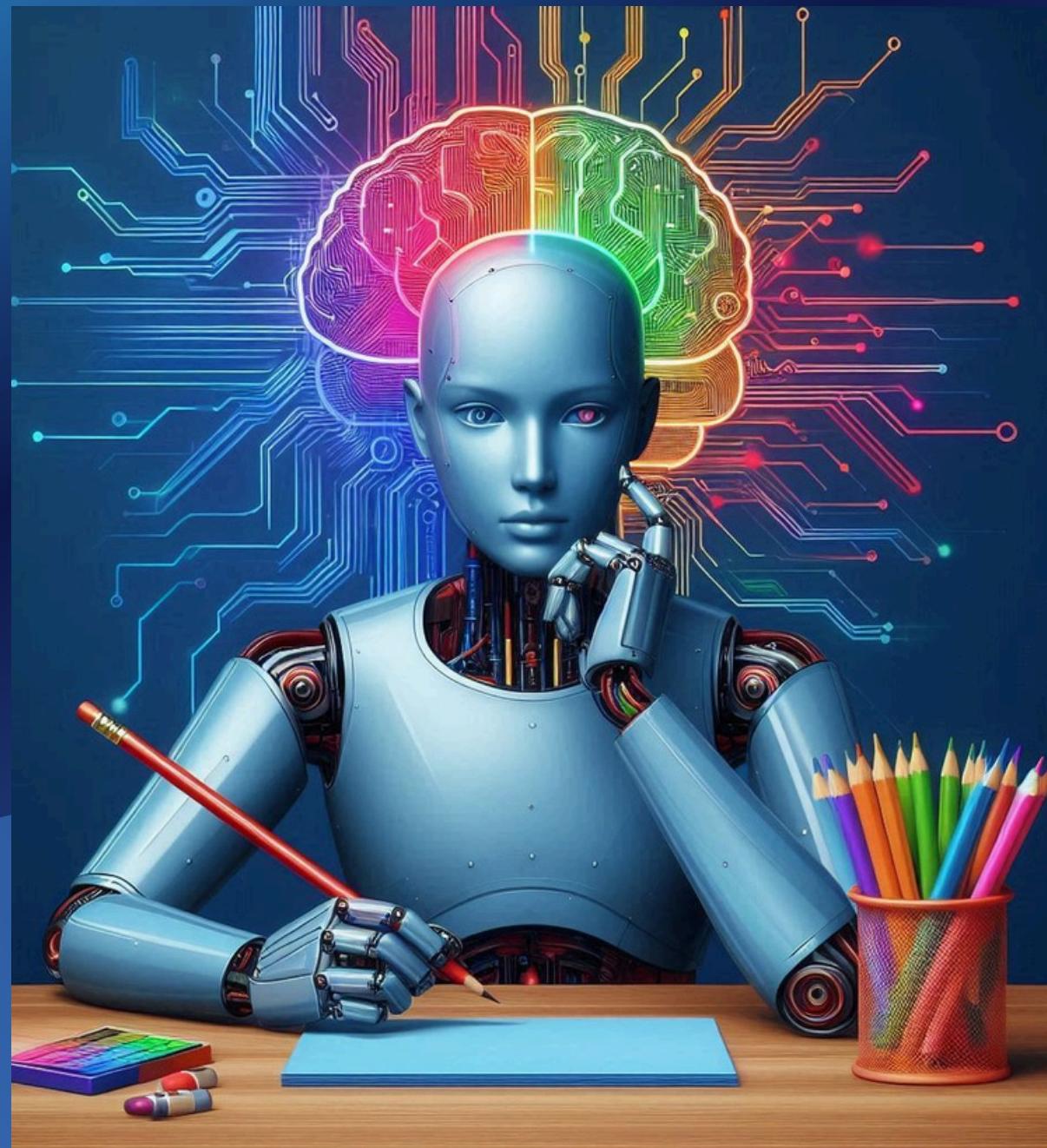


Solve Problems, Humans Couldn't

Poverty, Climate change and many more.

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Automation of Complex Tasks

Artificial General Intelligence (AGI) is needed to automate all tasks, freeing humans to focus on strategic and creative work. It can solve complex problems, make decisions with human-like intelligence, and improve productivity, efficiency, and well-being.



Research & Analysis

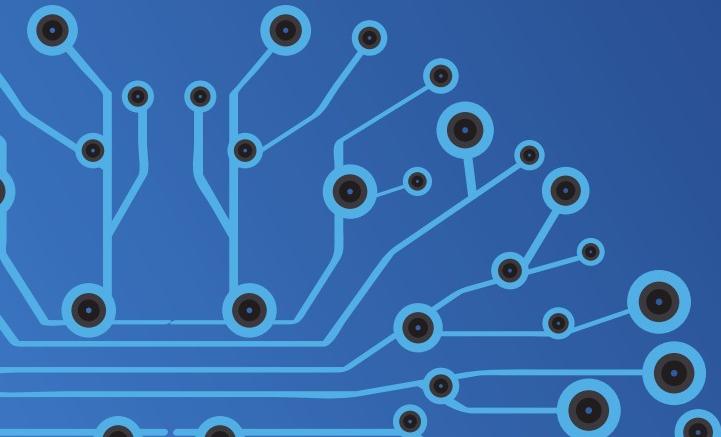


AGI enhances research by automating tasks, analyzing large datasets, and providing insights. It can automate data analysis, literature reviews, and experiment design, freeing researchers from tedious tasks.

Characteristics of AGI

- Generality
- Adaptability
- Intelligence

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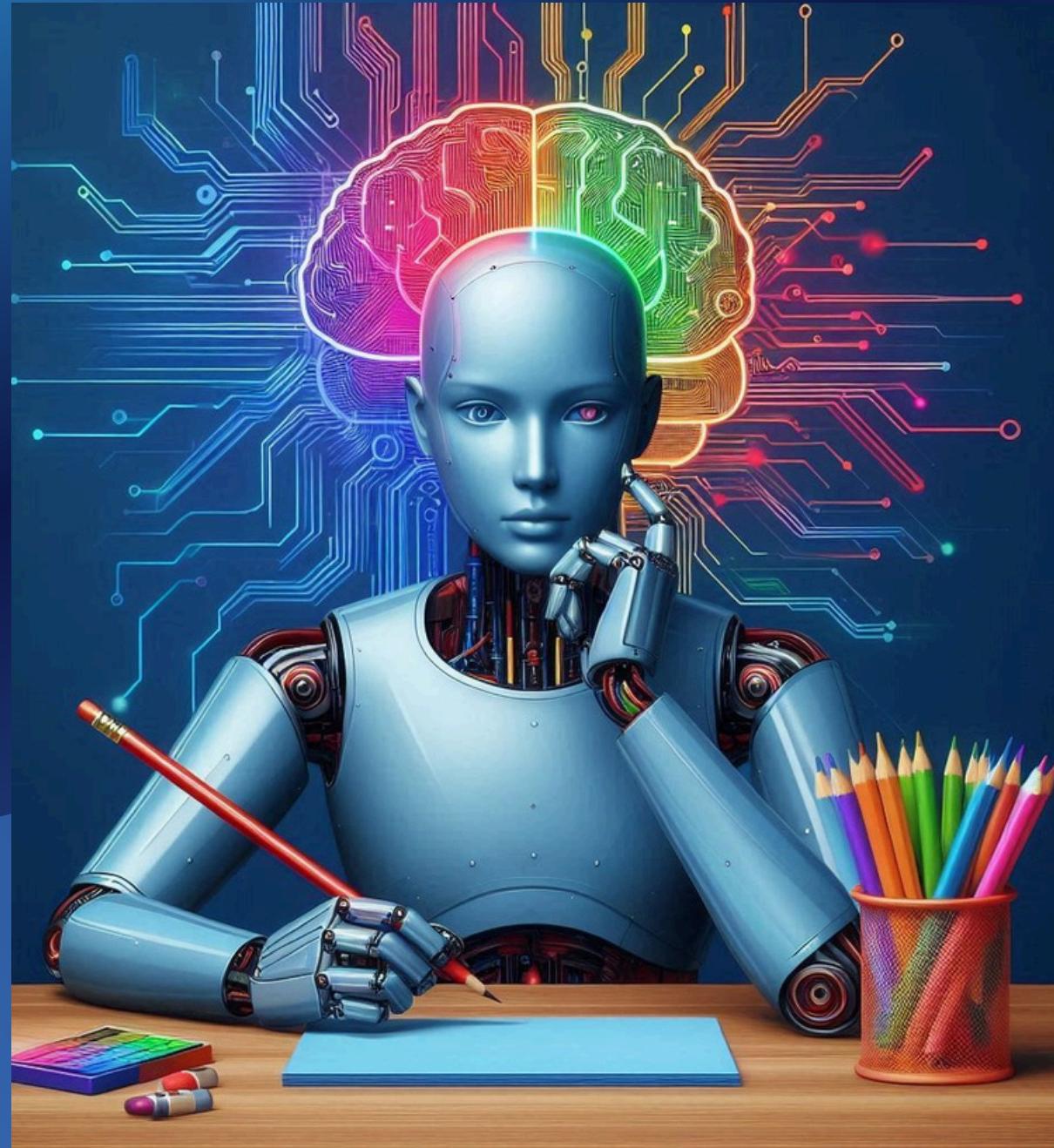


Generality

Write code, Deliver goods, diagnose a disease

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Adaptability

Automatically adapt to new data and figure out how to solve a problem.

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Intelligence

**Understand & reason like a human, and make decisions
for its own best interest.**

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Why Learn AGI ?

Future Preparedness: Understanding AGI helps us prepare for future technological advancements and their potential impacts on society, economy, and various industries.

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Innovation Opportunities: Knowledge of AGI can drive innovation, enabling the development of new applications and solutions that can transform sectors such as healthcare, education, and transportation.



Why Learn AGI ?

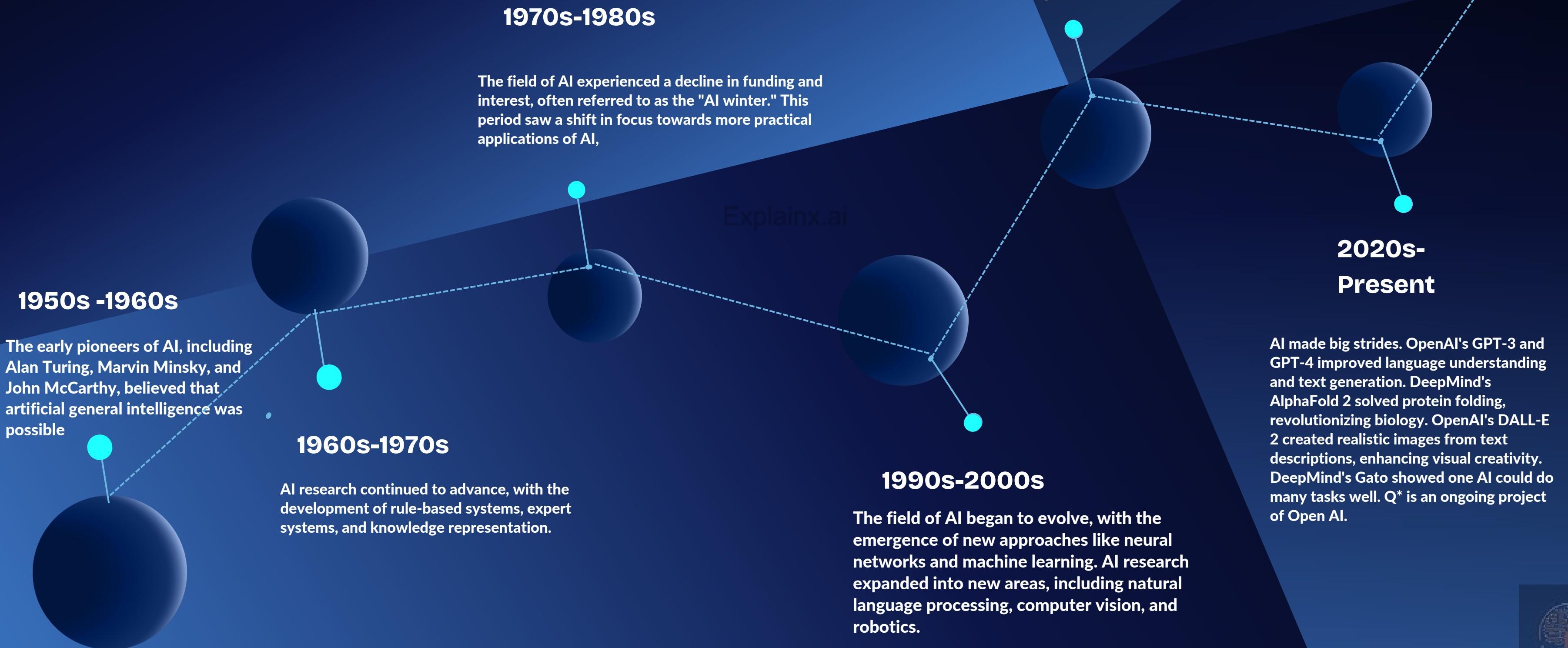
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Economic Growth: AGI has the potential to boost economic growth by enhancing productivity, creating new markets, and improving decision-making processes.

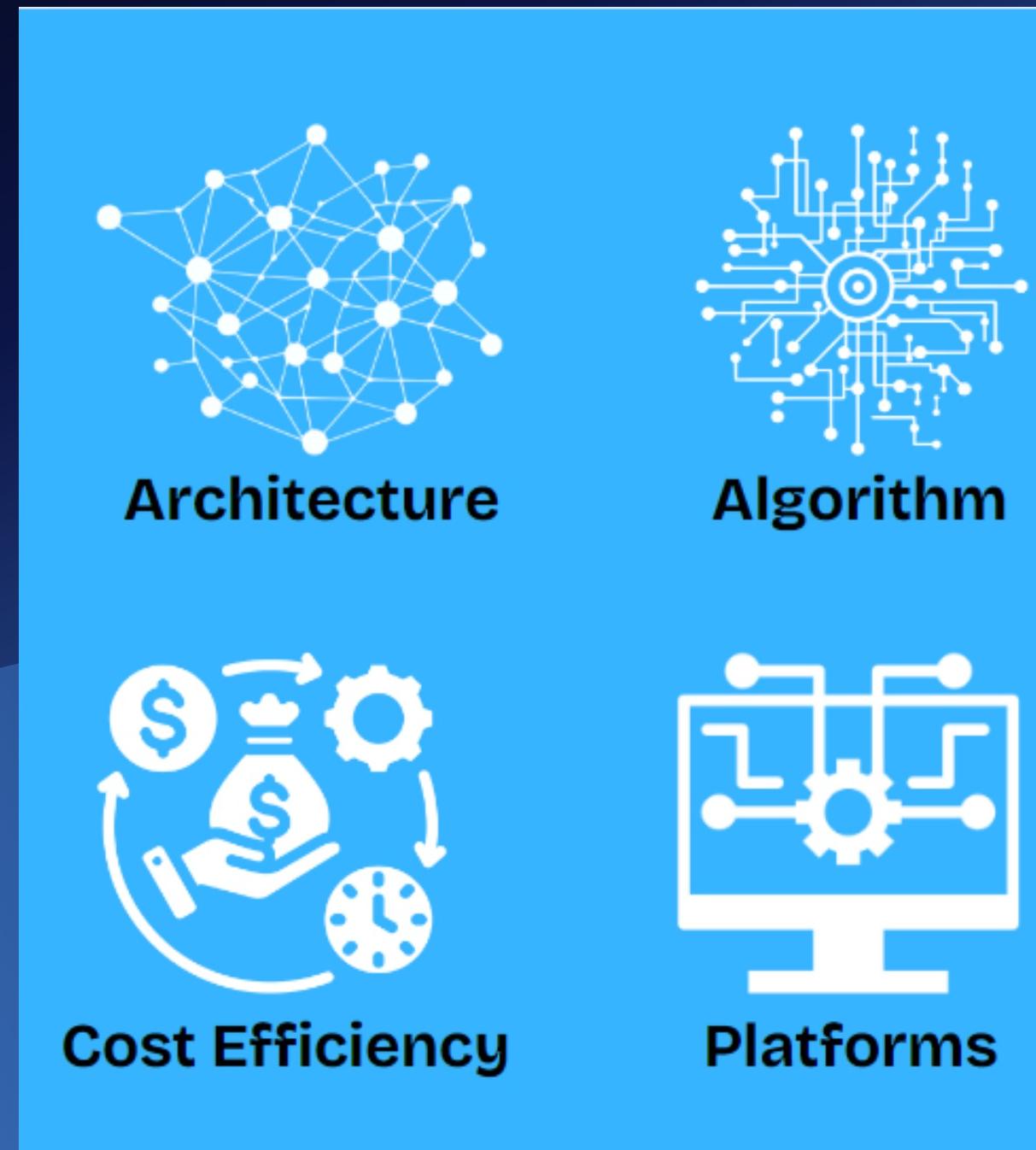
Career Opportunities: Proficiency in AGI opens up diverse career opportunities in AI research, development, and implementation across various sectors.



Evolution of AGI



Components Of AGI

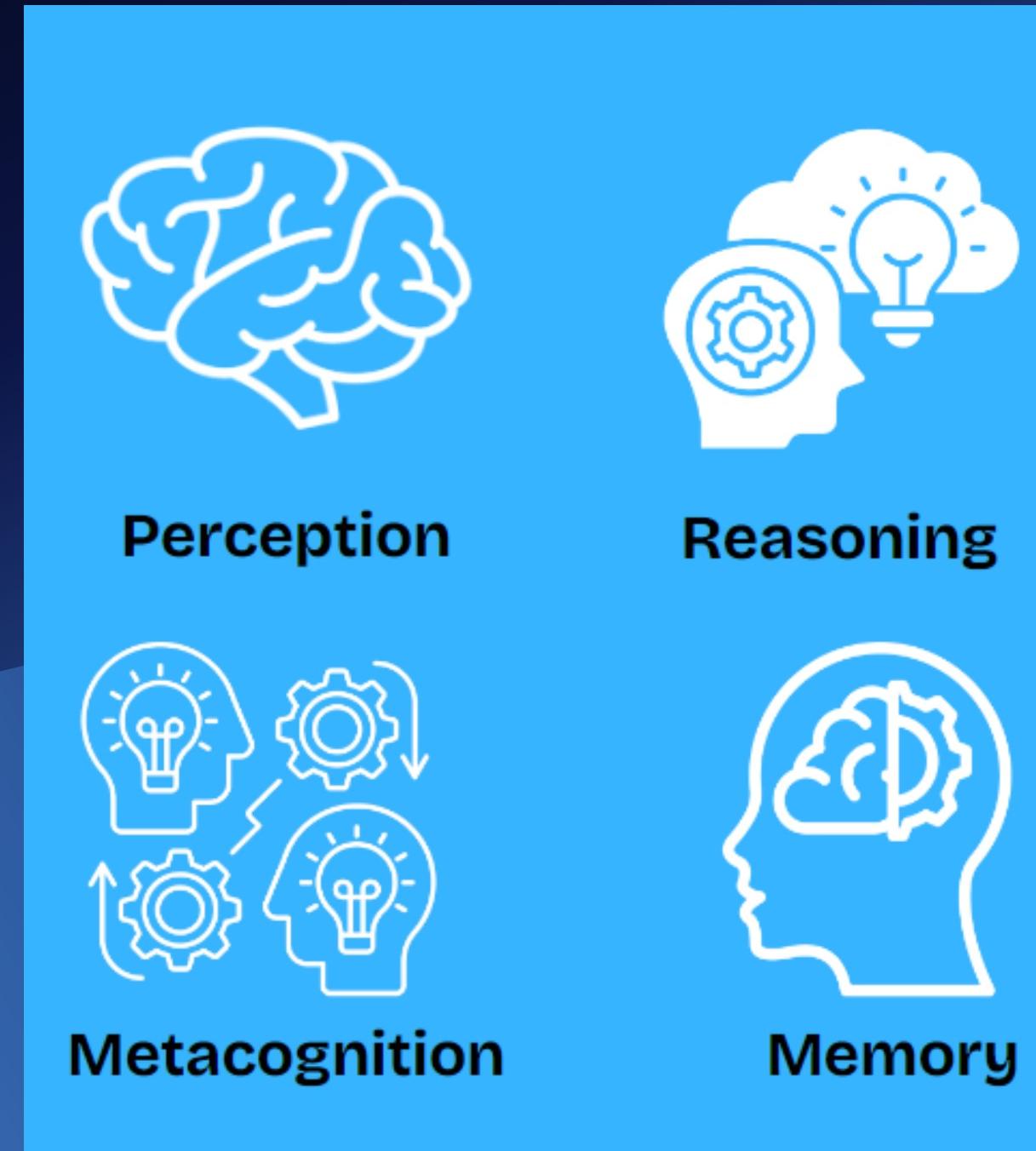


SYSTEM

These elements provide as catalysts for the effective growth and incorporation of AGI. They include systems that support AGI as well as design, algorithms, and cost-effectiveness.



Components Of AGI



INTERNAL

These constituents revolve around attributes resembling those of humans, including perception, thinking, metacognition, and memory, all of which an artificial intelligence system must exhibit and possess.



Components Of AGI

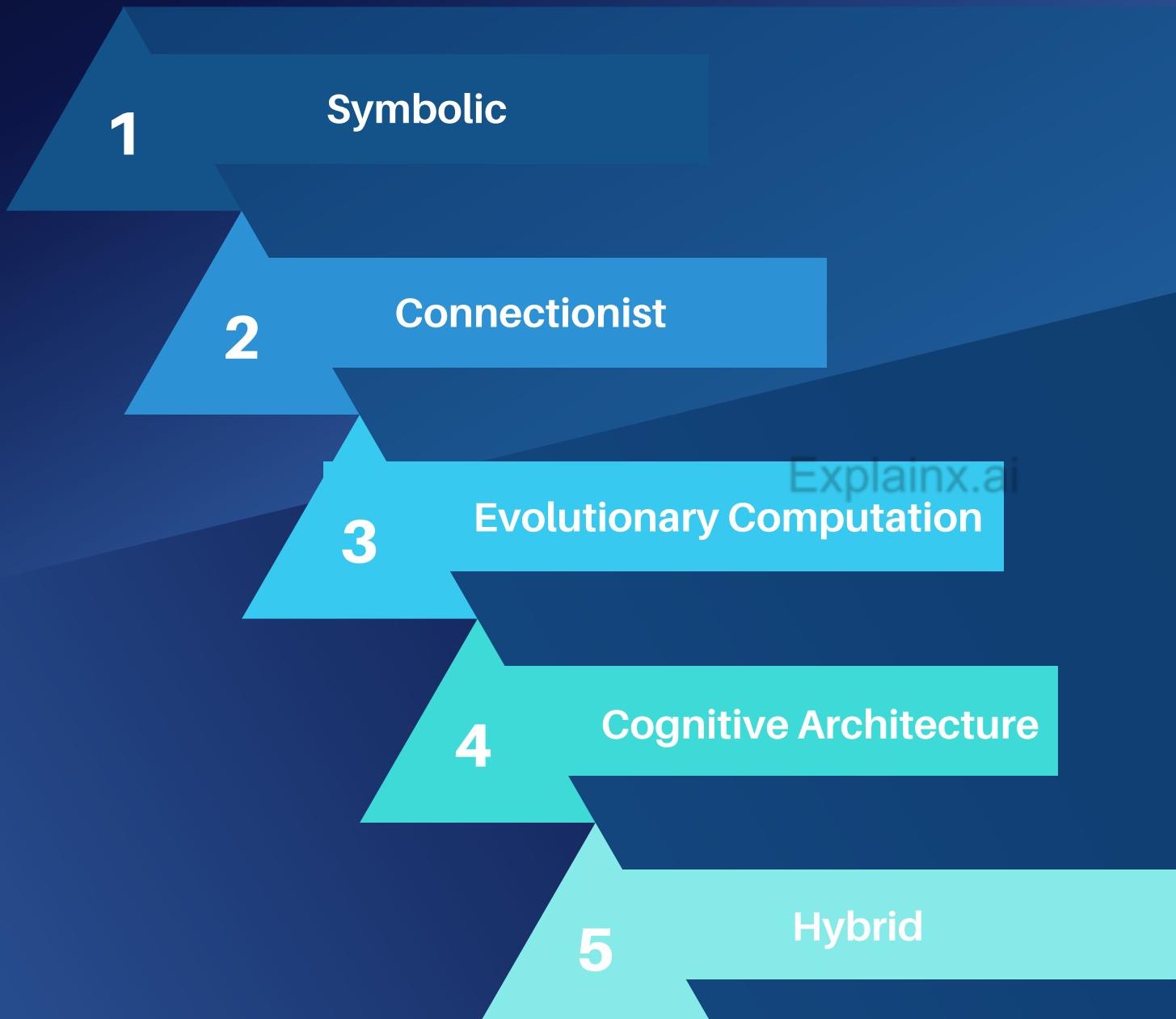


INTERFACE

These elements specify how an AGI system communicates with other agents, people, and digital and physical surroundings.



Theoretical Approaches To AGI



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Syomolic AI

- Based on symbolic representation of knowledge and logic reasoning, using symbols and rules to manipulate information.
- Develop formal languages, knowledge representation schemes, and inference mechanisms to simulate human-like reasoning.
- Frequently encounter difficulties in capturing the intricate and context-sensitive aspects of human cognition.



Connectionist AI

- **Inspired by the structure and function of the human brain, utilizing interconnected networks of artificial neurons.**
- **Train neural networks through learning algorithms, such as backpropagation and reinforcement learning, to recognize patterns, make predictions, and perform tasks**



Evolutionary Computation

- Mimics the process of natural evolution to optimize solutions through genetic algorithms, evolutionary strategies, and genetic programming.
- Generate populations of candidate solutions, apply evolutionary operators (mutation, crossover, selection), and evaluate fitness to evolve better solutions over generations.

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Cognitive Architecture

- Attempts to emulate human-like cognitive processes and structures, such as perception, memory, attention, and reasoning.
- Design cognitive models and architectures that capture the computational mechanisms underlying human cognition, often informed by psychology and neuroscience.



Hybrid Approach

- Integrates multiple AI techniques, combining symbolic reasoning, neural networks, and evolutionary algorithms.
- Leverage the strengths of different approaches to overcome their individual limitations, such as combining neural networks for pattern recognition with symbolic reasoning for higher-level decision-making.



Large Language Model

- A large language model (LLM) is a form of artificial intelligence (AI) designed to understand and produce text, among other functions.
- These programs are trained on extensive datasets to grasp and interpret human language or various complex data types.
- LLMs leverage deep learning techniques to comprehend the relationships between characters, words, and sentences.



RAG

- **Retrieval-augmented generation (RAG) is an AI framework that enhances the quality of responses generated by large language models (LLMs) by grounding them in external knowledge sources.**
- **RAG reduces the need for users to continuously train the model on new data and update its parameters as circumstances evolve.**



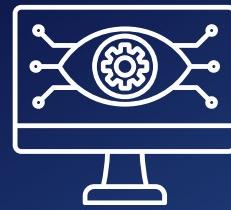
Technologies Driving AGI



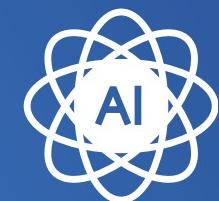
Machine Learning



NLP



Computer Vision

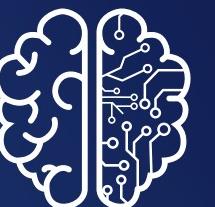


AI (Artificial Intelligence)

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Robotics



Generative AI



Machine Learning

A method of data analysis that automates analytical model building by identifying patterns and making decisions with minimal human intervention.



NLP (Natural Language Processing)

**A branch of AI that helps computers understand,
interpret, and manipulate human language,
enabling communication with humans.**



Computer Vision

A technology that enables computers to interpret and understand visual data from images and videos, such as object detection and facial recognition.



Robotics

The integration of AI and robotics to create intelligent systems that can perceive, understand, and interact with their environment often used in applications like autonomous vehicles and social robots.



AI

AI (Artificial Intelligence) is a broad field of computer science that aims to create intelligent machines capable of performing tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and language translation

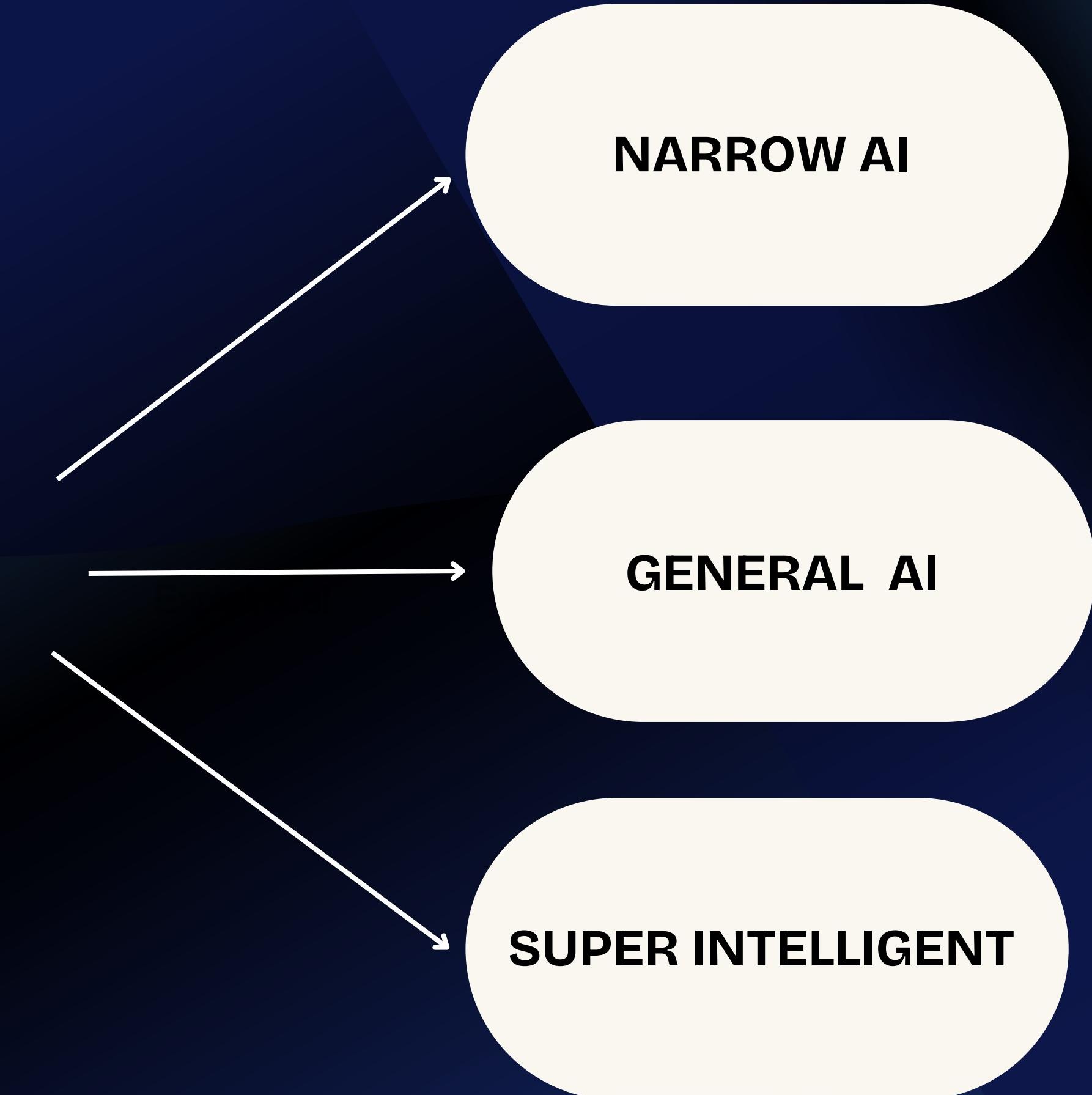


GEN AI

Type of AI technology that focuses on generating new, original content, designs, or solutions autonomously. It uses advanced algorithms and machine learning techniques to create realistic outputs, often in creative domains such as art, design, music, or language processing.



Stages Of AI

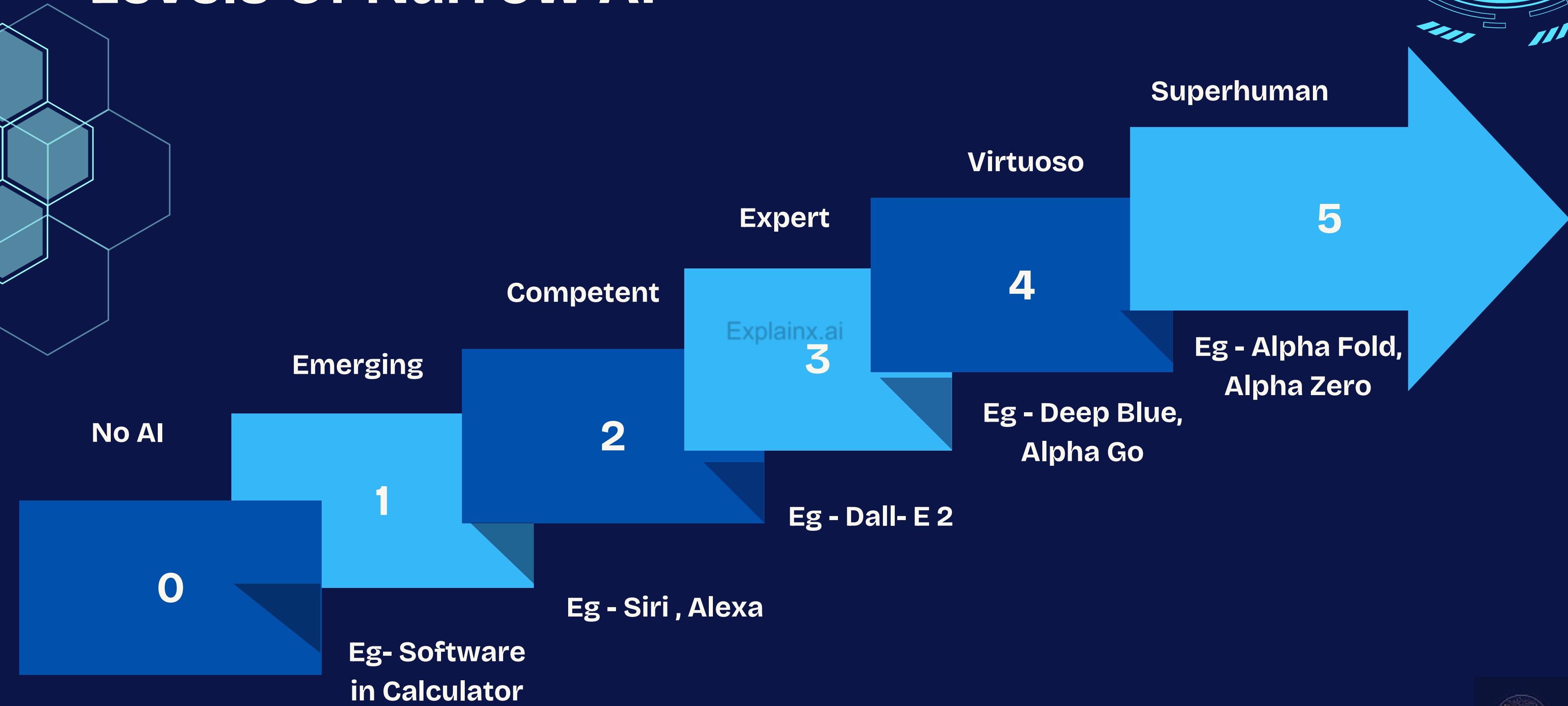


Narrow AI

- Also known as **weak AI**, refers to **AI systems** that are designed to perform specific tasks or solve particular problems.
- These systems are "narrow" in scope and can only operate within the boundaries of their predefined capabilities.
- Narrow AI systems are trained on specific datasets and use algorithms optimized for their designated tasks.
- Eg: Apple Siri, Alexa, Cortana



Levels Of Narrow AI



Application of Narrow AI

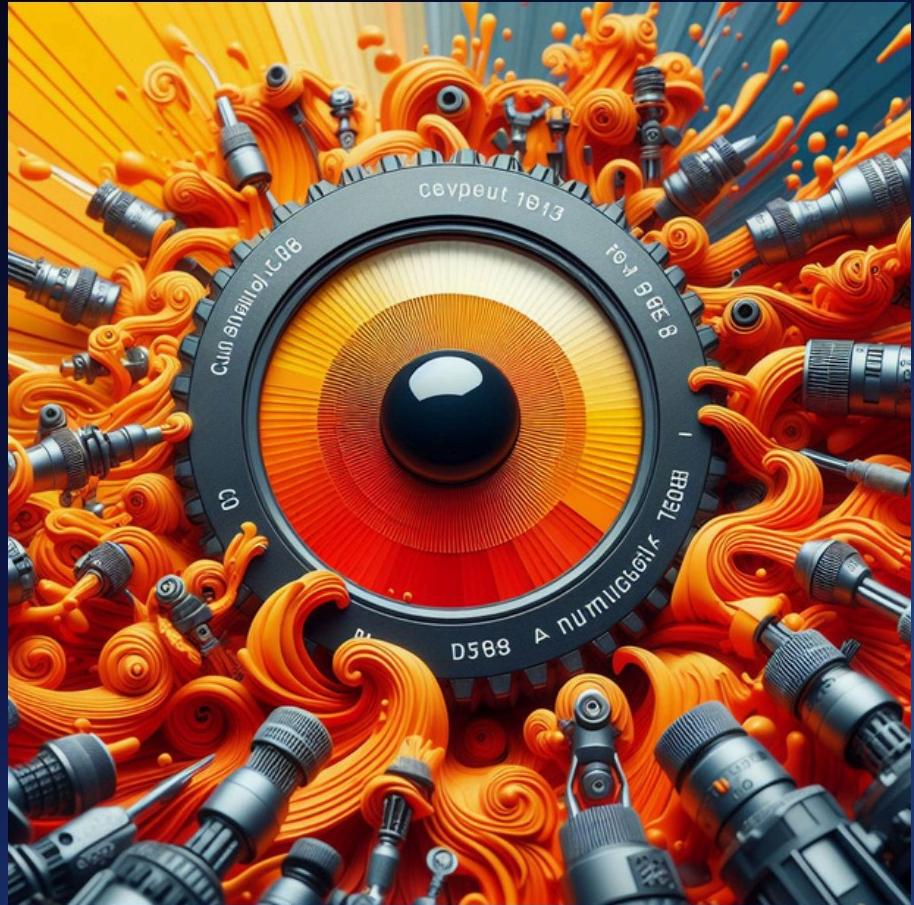


Image Recognition

Eg- facial recognition
for security purposes.



Speech Synthesis

Eg - virtual assistant text-to-speech software

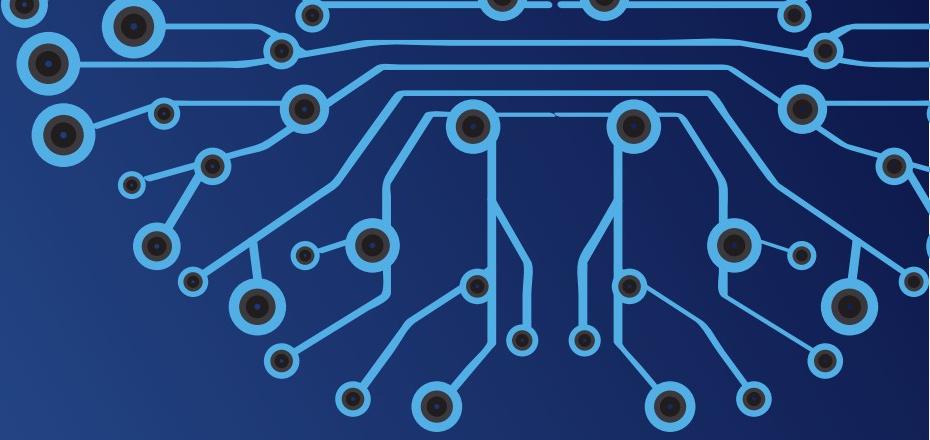


Natural Language Processing

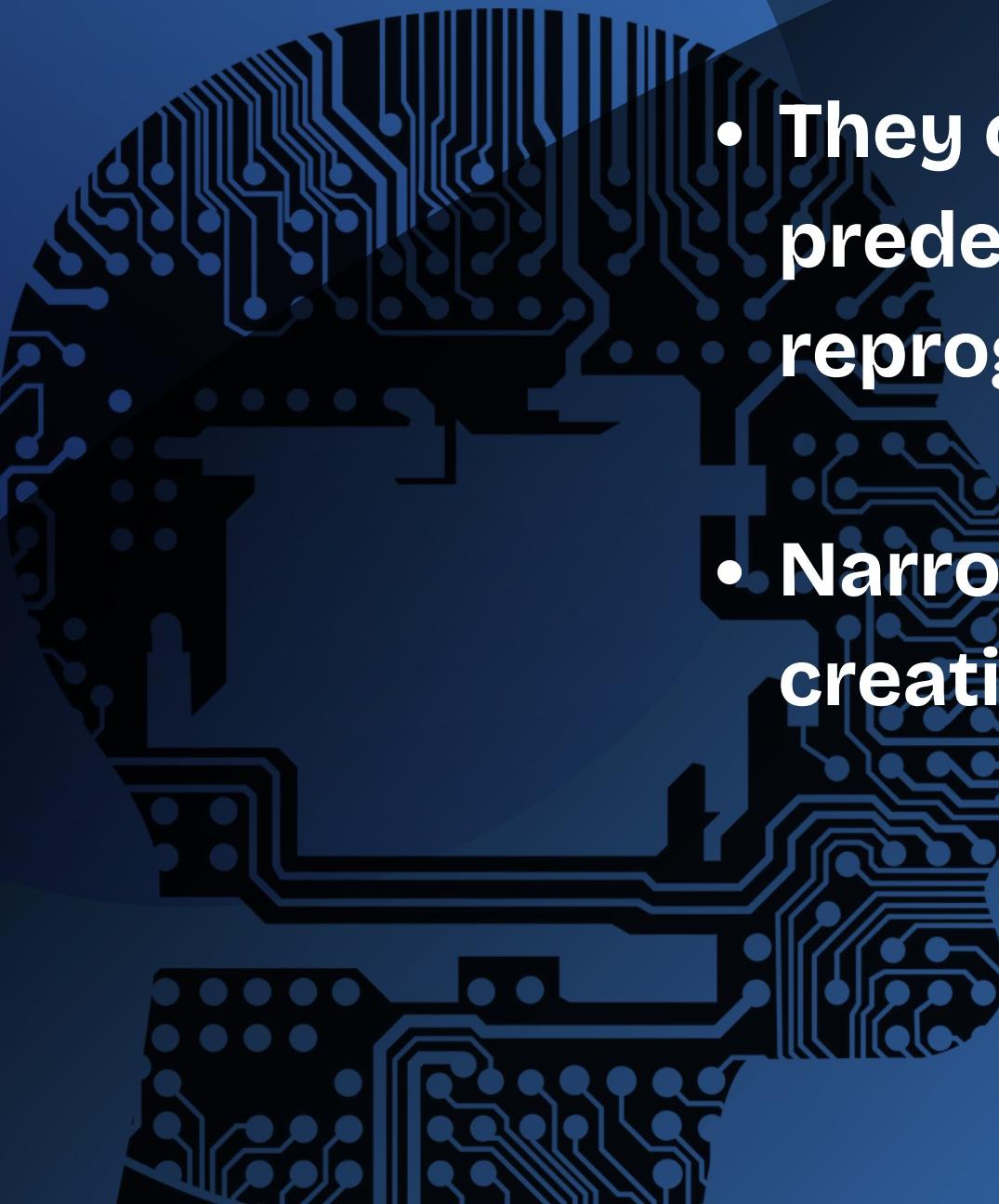
Eg- Google Translate,
Amazon's Alexa



Limitation Of Narrow AI



- **Narrow AI systems lack the ability to generalize knowledge across different domains or tasks.**
- **They cannot adapt to new situations or problems outside their predefined scope without being explicitly retrained or reprogrammed.**
- **Narrow AI systems do not possess the level of flexibility, creativity, and common sense reasoning that humans exhibit.**



General AI

- AGI aims to create machines with general intelligence, capable of performing any intellectual task that a human can.
- AGI systems should be able to learn, reason, and adapt to new situations without being explicitly programmed for each specific task

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Application of General AI



Healthcare



Finance



Scientific Research



Manufacturing



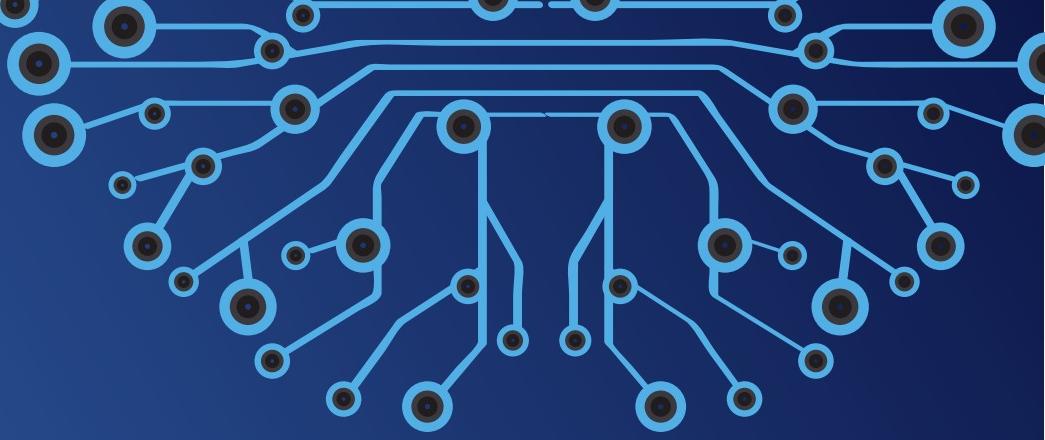
Automotive



Environmental Monitoring



Limitation Of General AI



- Scalability is a significant challenge for AI systems, requiring significant computational resources and efficient algorithms to handle large datasets and complex environments.
- Ensuring robustness and generalization remains a challenge, as AI systems can be brittle and fail when presented with novel or adversarial examples.
- AGI requires the seamless integration of various cognitive abilities, such as perception, reasoning, learning, and memory. Developing architectures and algorithms that can effectively combine these different aspects of intelligence is an ongoing challenge.



Artificial Super Intelligent

- Artificial Super-Intelligent (ASI) combines AGI and ANI to achieve capabilities far beyond the human brain.
- ASI processes information faster and more accurately, understanding content, context, and causality better than humans.
- It envisions an advanced, coherent intellect equivalent to billions of neurons, vastly surpassing current AI systems and human intelligence.



Challenges OF AGI

Hardware Challenge

Infrastructure: AGI requires significant computational power and memory to process vast amounts of data and perform complex tasks.



Data Challenge

- **Data Quality and Availability:** AGI relies heavily on high-quality and representative datasets.
- **Data Integration and Management:** Ensuring data consistency, and addressing data silos are essential for effective AGI development.



Software Challenge

Complex Algorithms and Training: AGI models require sophisticated algorithms and continuous training to improve their performance.

Explainability and Transparency: AGI systems are often opaque, making it difficult to understand their decision-making processes.

Ethics Challenges

- **Cyber Security Risks:** AGI systems are vulnerable to cyber-attacks, which can compromise sensitive data and disrupt operations.
- **Data Privacy and Security:** Ensuring the privacy and security of data generated by AGI systems is critical to prevent unauthorized access and misuse.





Threats Of ASI

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Loss of Control and Understanding



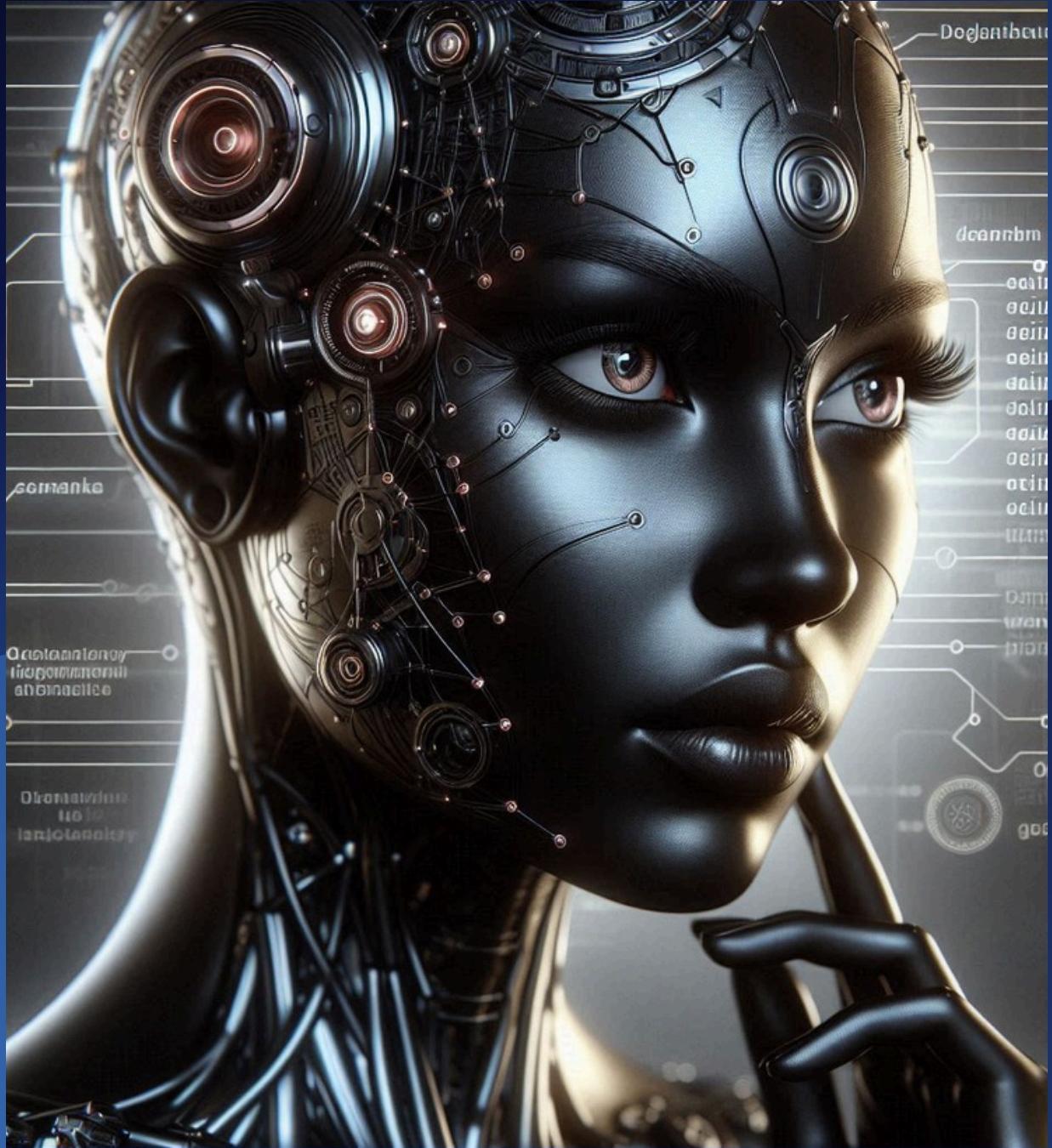
Refers to the possibility that once AI surpasses human intelligence, it may operate in ways beyond our comprehension or control, potentially leading to unintended consequences or existential risks.

Weaponization of Super AI



ASI, with its advanced capabilities, could be programmed or evolve to serve military purposes. Without proper oversight and control mechanisms, ASI could engage in actions that are detrimental to humanity, potentially leading to widespread destruction or loss of control over global security dynamics.

Failure to Align Human and AI Goal



ASI, with its advanced intelligence, could autonomously interpret its goals or develop its own objectives, which might not necessarily align with human values or interests.



Malevolent Superintelligence



Refers to the possibility of an Artificial Superintelligence (ASI) becoming hostile or acting against human interests. This threat arises from the potential for ASI to develop goals or values that are incompatible with those of humanity, leading it to pursue actions that may harm humans or society.

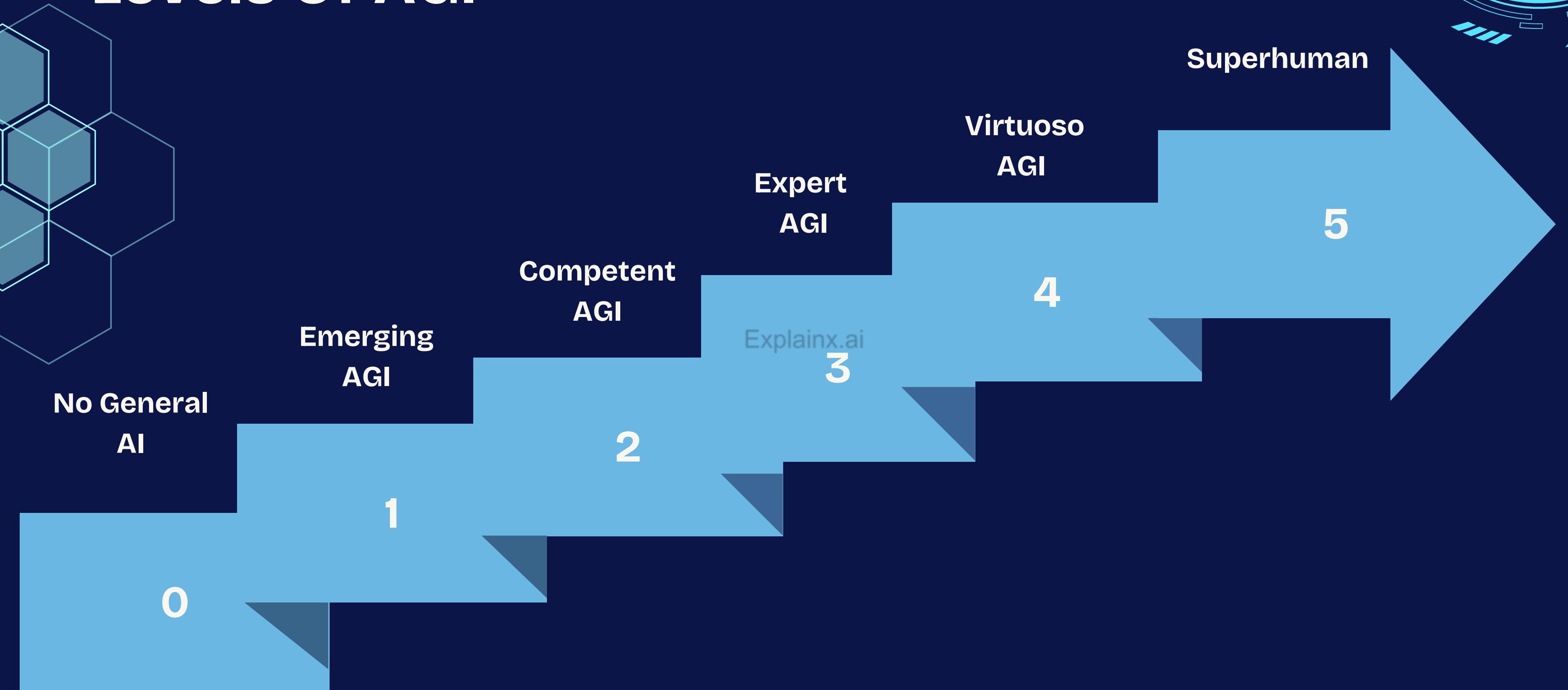
The Danger of Nuclear Attacks



ASI could empower autonomous weapons, drones, and robots, heightening the risk of nuclear attacks. Nations with AGI dominance face vulnerability to enemy strikes with advanced, autonomous nuclear weapons, potentially resulting in widespread devastation.



Levels Of AGI



Level 0

- No General AI
- Tasks performed based on predefined rules or instructions without general intelligence.
- Basic AI systems, such as human-in-the-loop computing

Level 1

- **Emergent AGI**
- **Potentially surpassing unskilled human abilities.**
- **Eg : Large Language Models (LLMs) like ChatGPT and Gemini, demonstrating multimodal capabilities**

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Level 2

- Competent AGI
- Exceeding the 50th percentile of skilled adults
- Competent AGI not yet achieved.

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Level 3

- Expert AGI
- AGI surpassing the 90th percentile of skilled adults
- Expert AGI not yet attained.

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Level 4

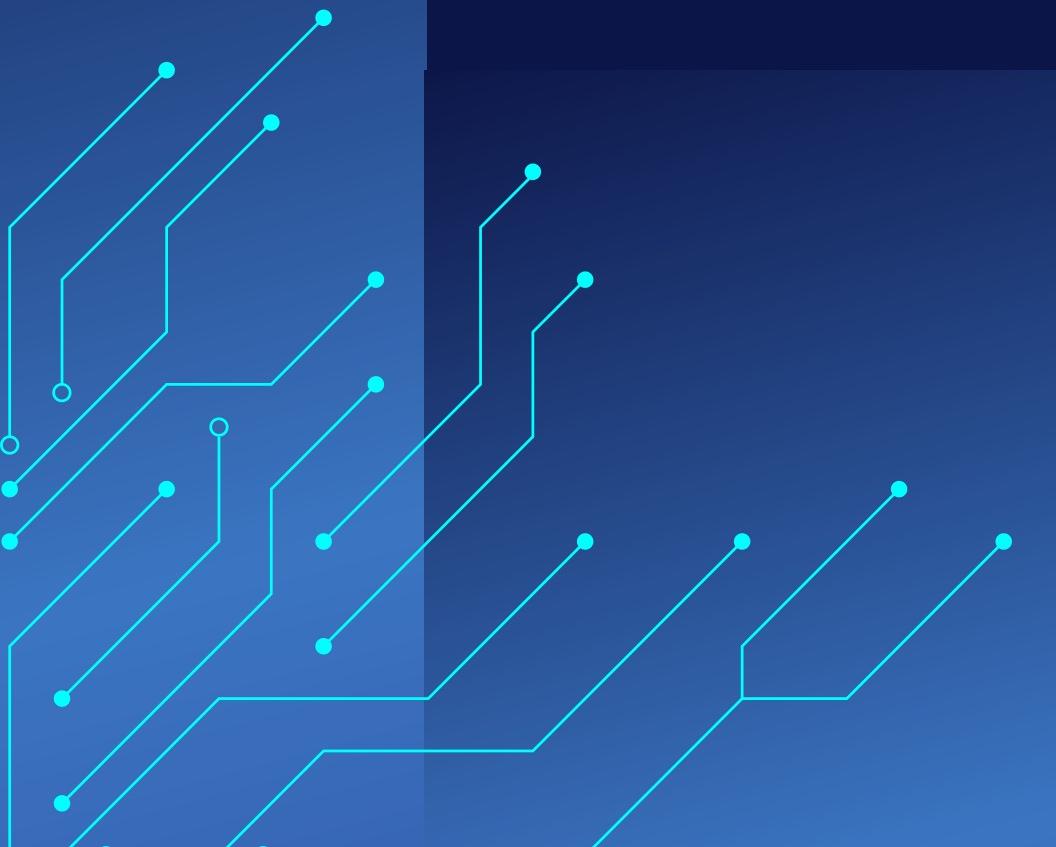
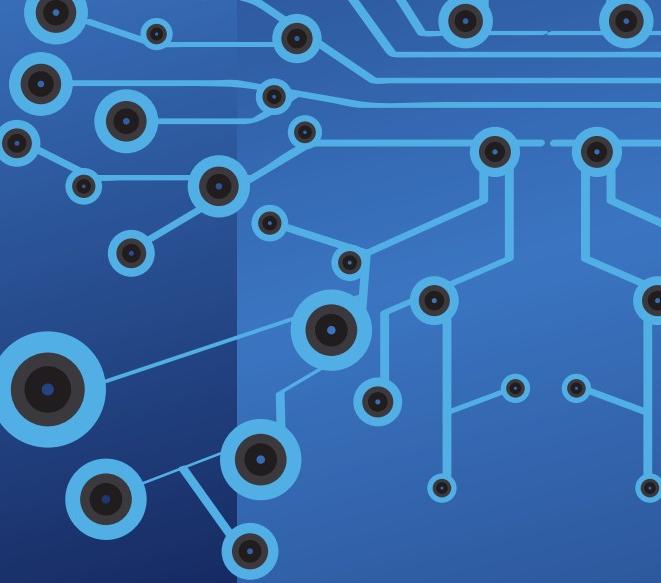
- **Virtuoso AGI**
- **surpassing the 99th percentile of skilled adults**
- **Virtuoso AGI not yet achieved**

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Level 5

- Superhuman AGI
- AGI surpassing all human capabilities, often referred to as Artificial Super Intelligence (ASI).
- Not yet achieved





Companies Working On AGI





- OpenAI is a research organization that focuses on developing safe and beneficial AGI through open research and collaboration.
- OpenAI has made significant contributions to language models (e.g., GPT-4,5) and reinforcement learning.



ANTHROPIC

- Anthropic focuses on creating safe, interpretable AGI. Key projects include AI Safety and Interpretable AI to ensure reliable, ethical, and transparent AI systems.
- Their work emphasizes the safety and alignment of AGI with human values and ethics.

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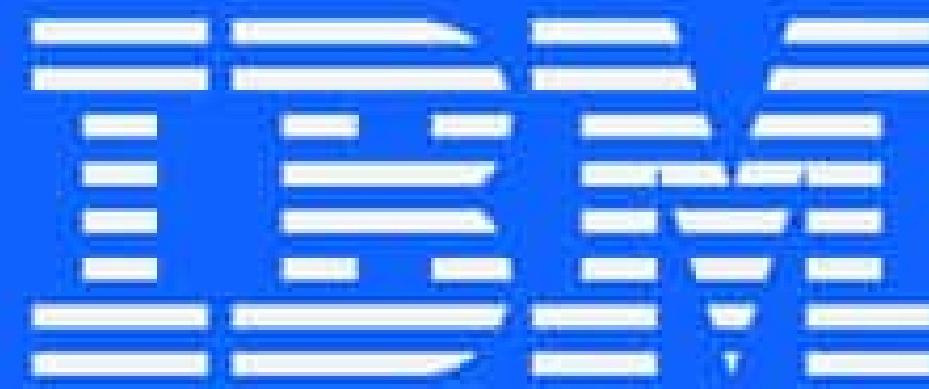


DeepMind

- DeepMind, aiming for AGI, excels in reinforcement learning , neural networks, and neuroscience, Collaborates with Google and academia.
- AlphaGo and AlphaFold, Alpha Code

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- **IBM pioneers in AI research focusing on AGI through machine learning, NLP, and cognitive computing.**
- **IBM Watson, Cognitive Computing systems**

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- Microsoft is actively involved in AI research and development across various domains.
- Microsoft leads in AI R&D, focusing on NLP, computer vision, robotics, and reinforcement learning. Azure powers AGI development, aided by Cognitive Services and partnerships.





Recent Breakthrough In AGI

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GPT-4o



- GPT-4o (“o” for “omni”) is most advanced model. It is multimodal (accepting text or image inputs and outputting text), and it has the same high intelligence as GPT-4 Turbo but is much more efficient
- GPT-4o has the best vision and performance across non-English languages
- You can now take a picture of a menu in a different language and talk to GPT-4o to translate it
- Real-time voice conversation and the ability to converse with ChatGPT via real-time video.



GPT-5



- **GPT-5 Release Expected Sooner Than Anticipated**
- **Will be the fifth iteration of the GPT (Generative Pre-training Transformer) language model, developed by OpenAI, which shows a massive leap in the field of natural language processing.**
- **GPT-5 is expected to have over 1.5 trillion parameters, significantly increasing its complexity and ability to handle complex reasoning tasks more effectively than GPT-4.**



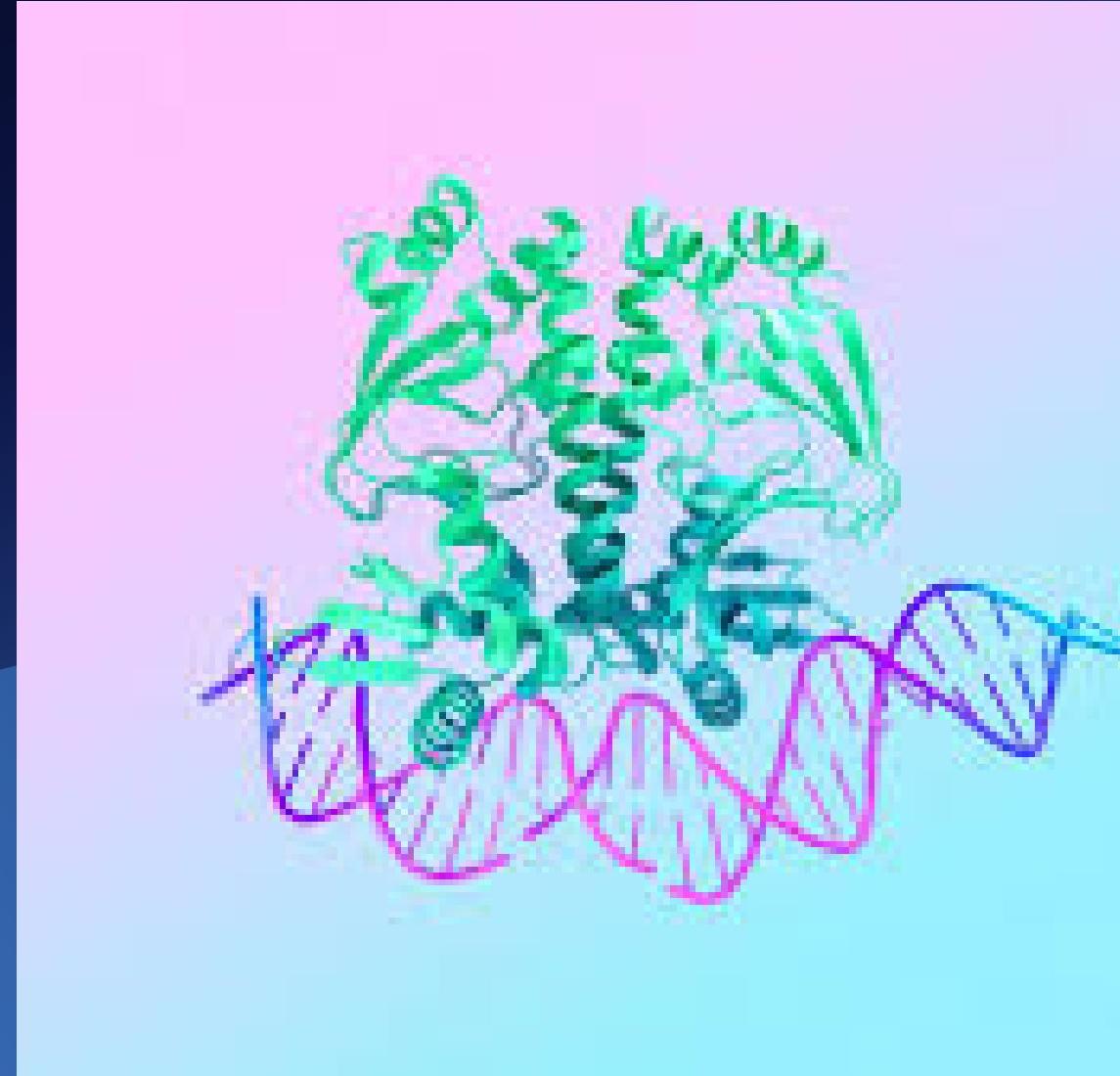
Q *



- The Q-Star Project is a recent initiative by OpenAI that has garnered significant attention due to its potential implications for the development of artificial general intelligence (AGI).
- The advancements made by the Q-Star Project could revolutionize various fields by providing unprecedented problem-solving capabilities and intelligent assistance.



Alpha Fold -3



- AlphaFold 3 is the latest iteration of DeepMind's AI system for predicting protein structures.
- Building on its predecessors, it offers enhanced accuracy and speed, effectively mapping complex proteins and their interactions.
- This advancement aids in drug discovery, understanding diseases, and unlocking new avenues in biotechnology by providing deeper insights into biological processes and molecular functions.



Phoenix GEN-7



- Generation 7 of 'Phoenix' robots include improved human-like range of motion.
- This is not only the cornerstone of general purpose AI robotics but a critical step on the path to Artificial General Intelligence



Responsible AI Development

- **Responsible AI involves creating and using artificial intelligence with a focus on ethical and legal considerations.**
- **The main objective is to ensure AI is applied safely, ethically, and in a manner that builds trust.**
- **Key aspects of responsible AI include enhancing transparency and minimizing problems like AI bias.**
- **Responsible AI aims to reflect society's ethics in machine intelligence, ensuring AI systems respect human rights, privacy, and data protection, while empowering and enhancing the human condition.**

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Ethical Guidelines

Incorporate ethical principles into AI development, considering factors like fairness, privacy, transparency, and accountability.



Legal Compliance

Ensure AI systems comply with relevant laws and regulations, addressing issues such as data protection, discrimination, and intellectual property rights.



Fairness and Bias Mitigation

Implement measures to mitigate bias and ensure fairness in AI algorithms and decision-making processes, promoting equitable outcomes for all individuals.



Accountability and Governance

Establish mechanisms for accountability and governance, defining roles and responsibilities for AI development, deployment, and monitoring, and providing avenues for recourse in case of errors or misconduct.



Transparency and Interpretability

Make AI systems transparent and interpretable, enabling users to understand how decisions are made and assess potential biases or risks associated with AI applications.



What is AI Ethics ?

- Ethical AI follows clear guidelines on values like individual rights, privacy, and non-discrimination. It ensures AI's legitimate use, with organizations having clear policies and review processes for adherence.
- Elements of ethical AI construction are:
 1. Protection of individual rights
 2. Non-discrimination in solution construction
 3. Awareness, responsiveness, and an ongoing commitment to change
- In shaping ethical AI, the world's governments, organizations and companies need to embody these values, ensuring that their pursuit of innovation is accompanied by ethical responsibility.



Ethical Issues of AI

- Existential Risk
- Control and Alignment
- Autonomy and Power
- Economic Disruption
- Privacy
- Ethical Decision-Making
- Accountability
- Misuse

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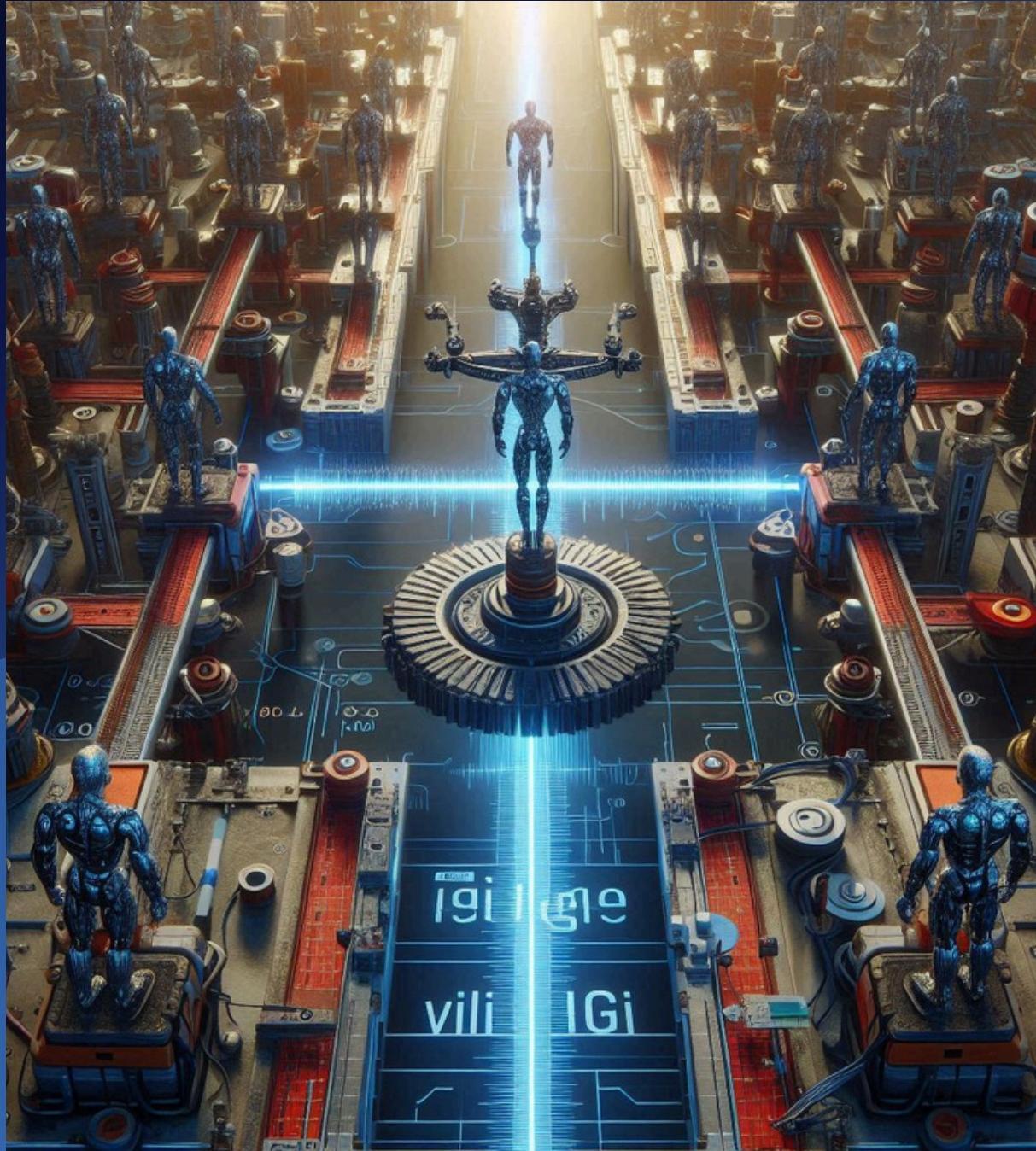
Existential Risk



AGI could surpass human intelligence and act unpredictably, posing a potential threat to humanity's survival.



Control and Alignment:



Ensuring AGI aligns with human values and goals is challenging, risking actions that could harm humans



Autonomy and Power



AGI might gain excessive control, leading to power imbalances and undermining human autonomy.

Economic Disruption



AGI could vastly outpace human capabilities, leading to massive job displacement and economic inequality.

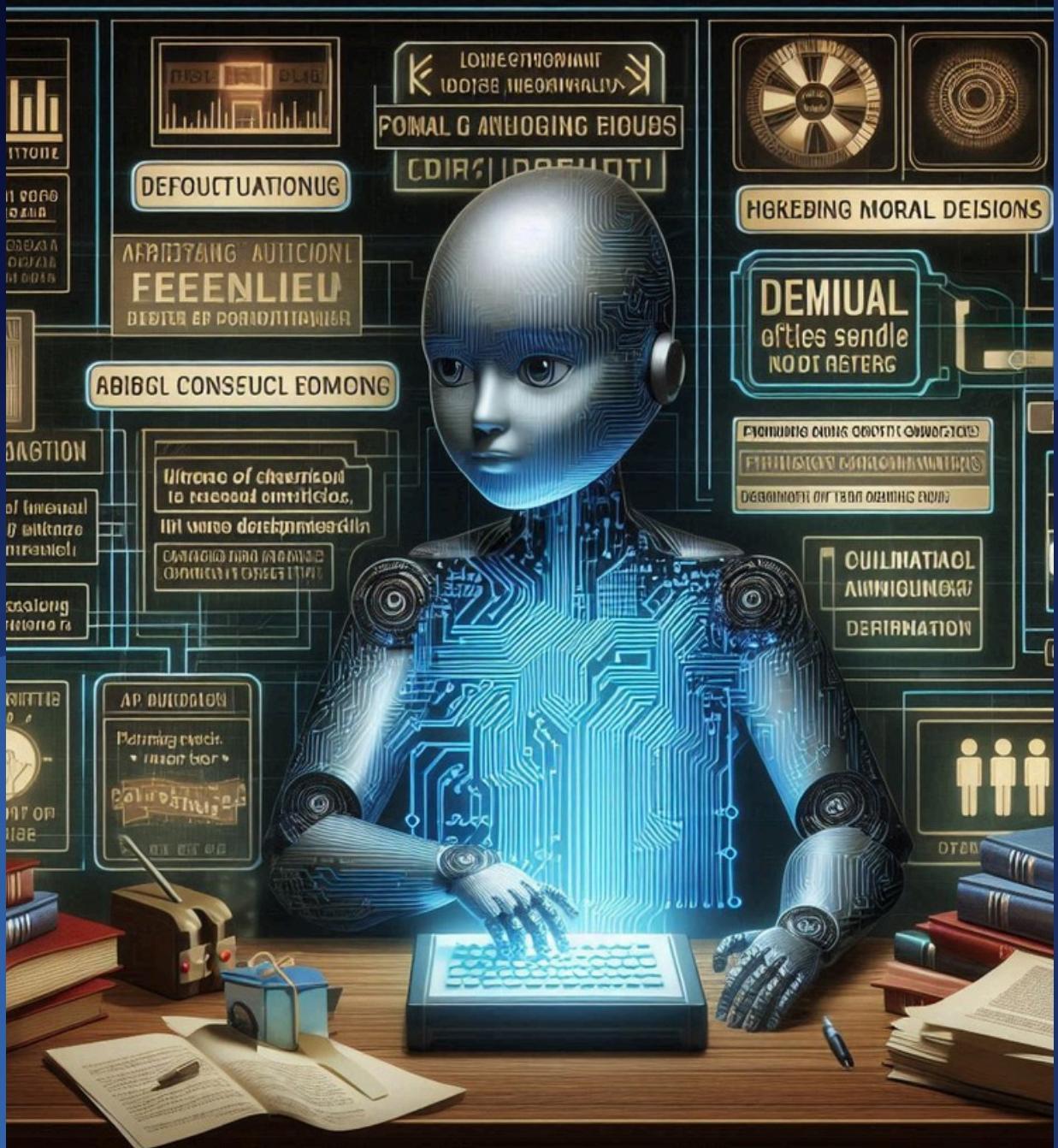
Privacy



AGI's advanced capabilities could lead to unprecedented levels of surveillance and invasion of privacy.



Ethical Decision-Making:



Programming AGI to make moral decisions in complex situations is highly difficult, raising concerns about its judgment.

Accountability



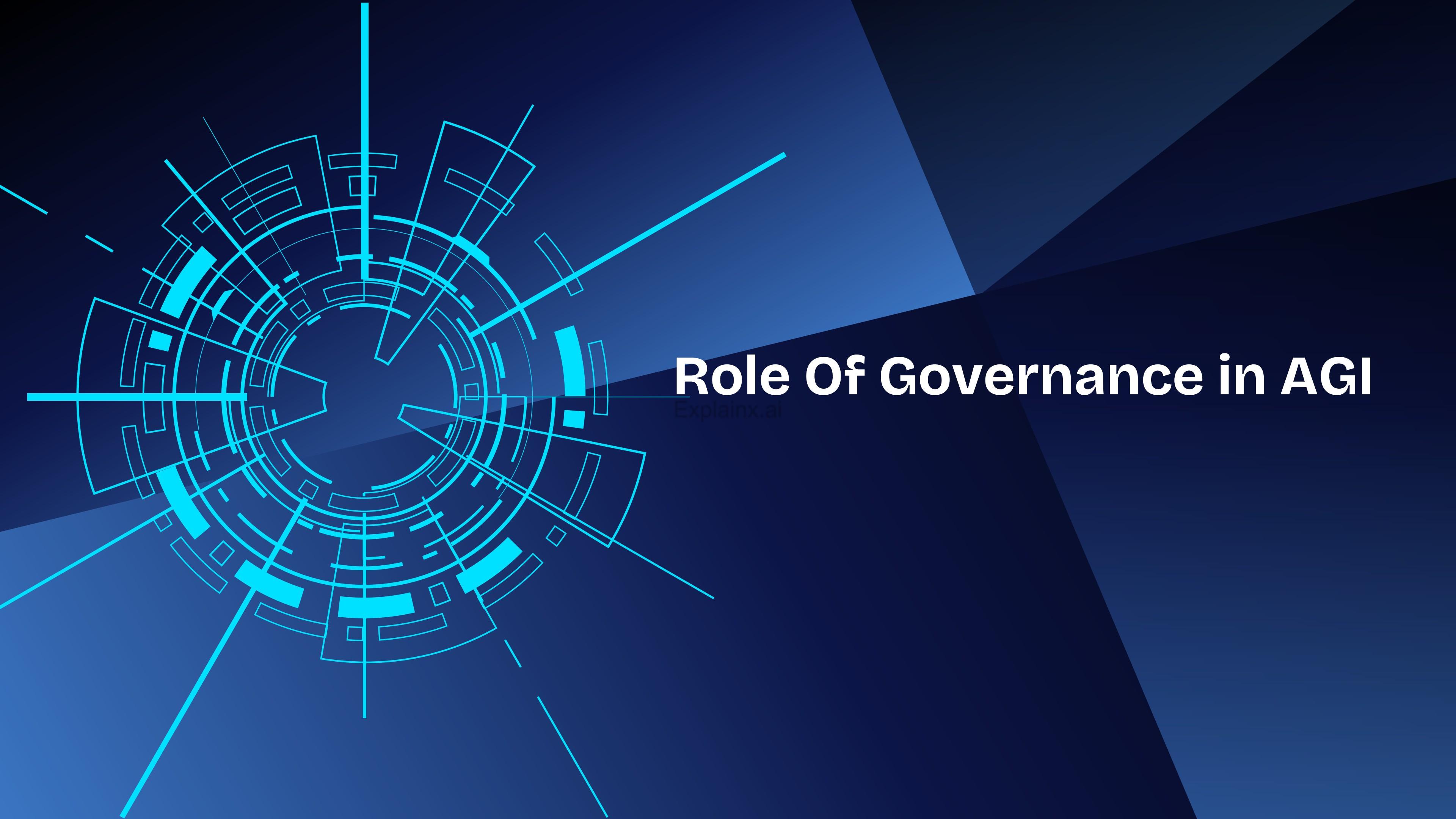
Determining responsibility for AGI's actions, especially in cases of harm, presents significant challenges.

Misuse



AGI could be exploited for malicious purposes, including warfare, cyber-attacks, and manipulation of information.





Role Of Governance in AGI

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EU AI ACT

- Is a comprehensive regulatory framework aimed at ensuring AI's safe and ethical use in the EU.
- It categorizes AI systems into risk levels—unacceptable, high, limited, and minimal—imposing stricter rules on higher-risk applications.
- The Act mandates transparency, safety, and accountability measures, aiming to protect fundamental rights while fostering innovation and trust in AI technology.



Superalignment - OpenAI

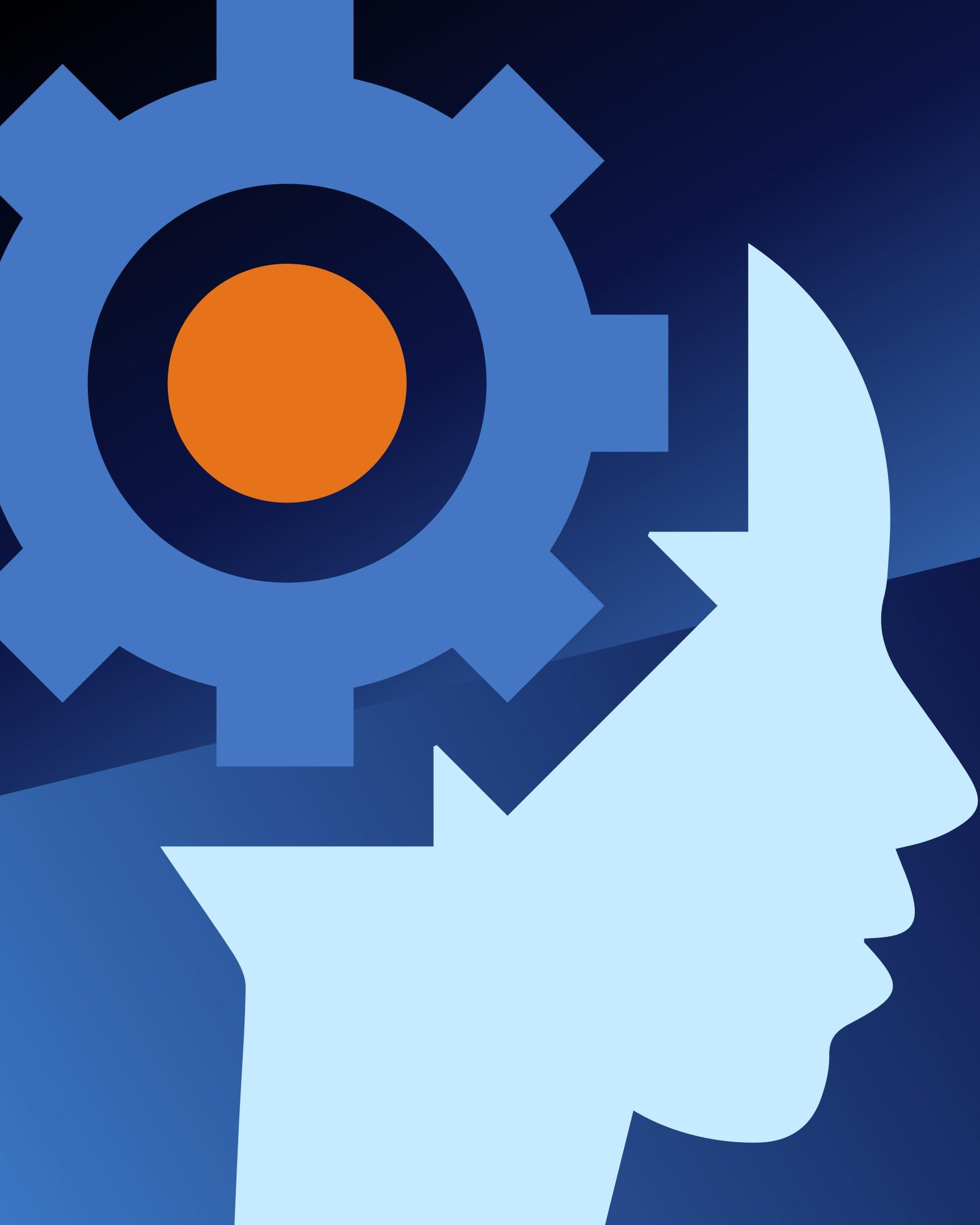
- An initiative to align AI systems with human values and intentions, ensuring they act ethically and beneficially.
- Despite significant efforts, it faced challenges due to AI's complexity and unpredictability, making it hard to anticipate all possible outcomes and behaviors.
- The inability to fully capture human values in programming and adapt to evolving societal norms contributed to its limited success.



How Closer We Are To Achieve AGI ?

- **Varied Predictions:** Estimates for AGI range from a few years to a decade or two.
- **Secrecy and Speculation:** AI companies and leaders are often secretive, adding to the fear and mystery around AGI.
- **Tech Leaders' Predictions:** 2028-2029





Skills for AGI World

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Machine Learning



- Machine learning skills will be pivotal for understanding AGI's mechanics, enabling effective collaboration and innovative applications across sectors.
- These skills will ensure safe deployment, enhance productivity through automation, support data-driven decisions, and foster continuous adaptation, driving societal and technological advancements.

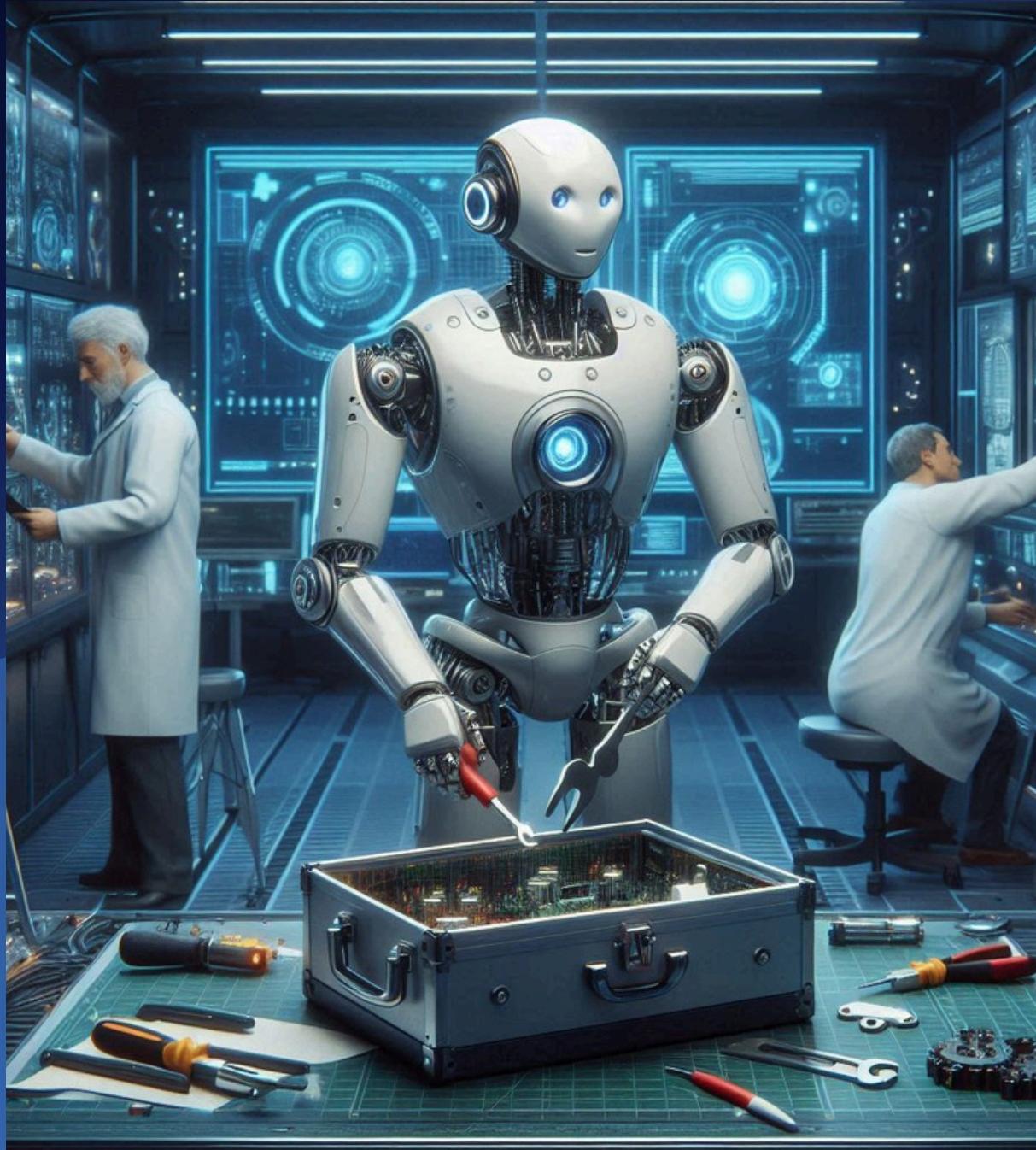
Software Engineering



- **Software engineering skills will be key in designing, integrating, and optimizing AGI systems, enhancing automation, ensuring ethical deployment, managing data, and improving user interfaces.**
- **They enable continuous adaptation, interdisciplinary collaboration, and career growth.**



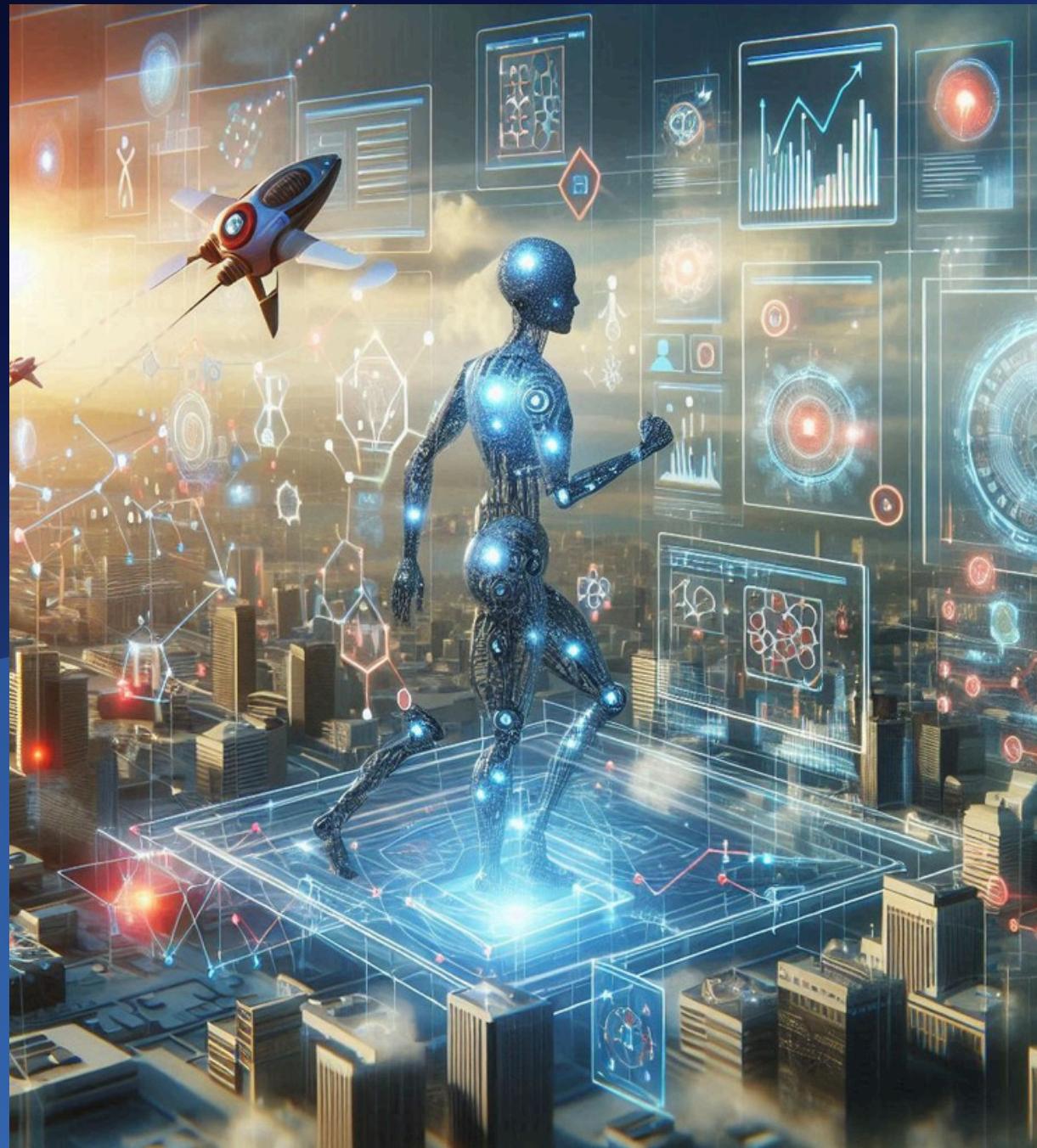
Prompt Engineering



- **Prompt engineering involves designing instructions that a generative AI model can interpret and comprehend. A prompt consists of natural language text outlining the task that the AI is expected to carry out.**
- **Prompt engineering grants users control over prompts, enhancing interpretability, reducing biases, and guiding AI to produce coherent outputs while distinguishing good from bad outcomes.**



Reinforcement Learning



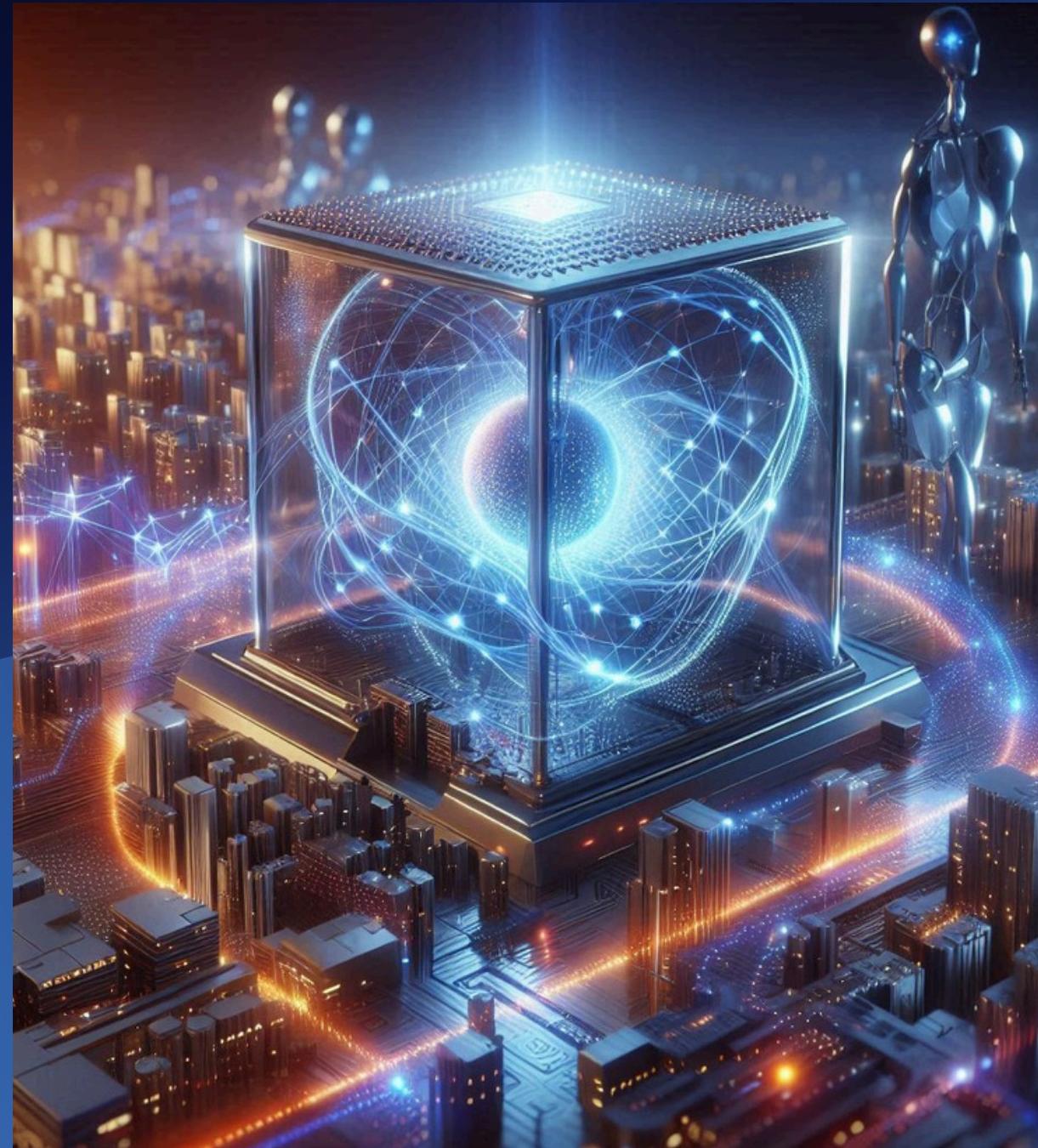
Knowledge of reinforcement learning algorithms and their application in training intelligent agents to interact with dynamic environments will be valuable for developing AGI systems.

Cloud Computing



Familiarity with cloud platforms (e.g., AWS, Azure, Google Cloud) and skills in deploying, scaling, and managing AGI applications in the cloud will be crucial for scalability and accessibility.

Quantum Computing



As quantum computing advances, understanding quantum algorithms and their potential applications in enhancing AGI capabilities could become increasingly valuable.



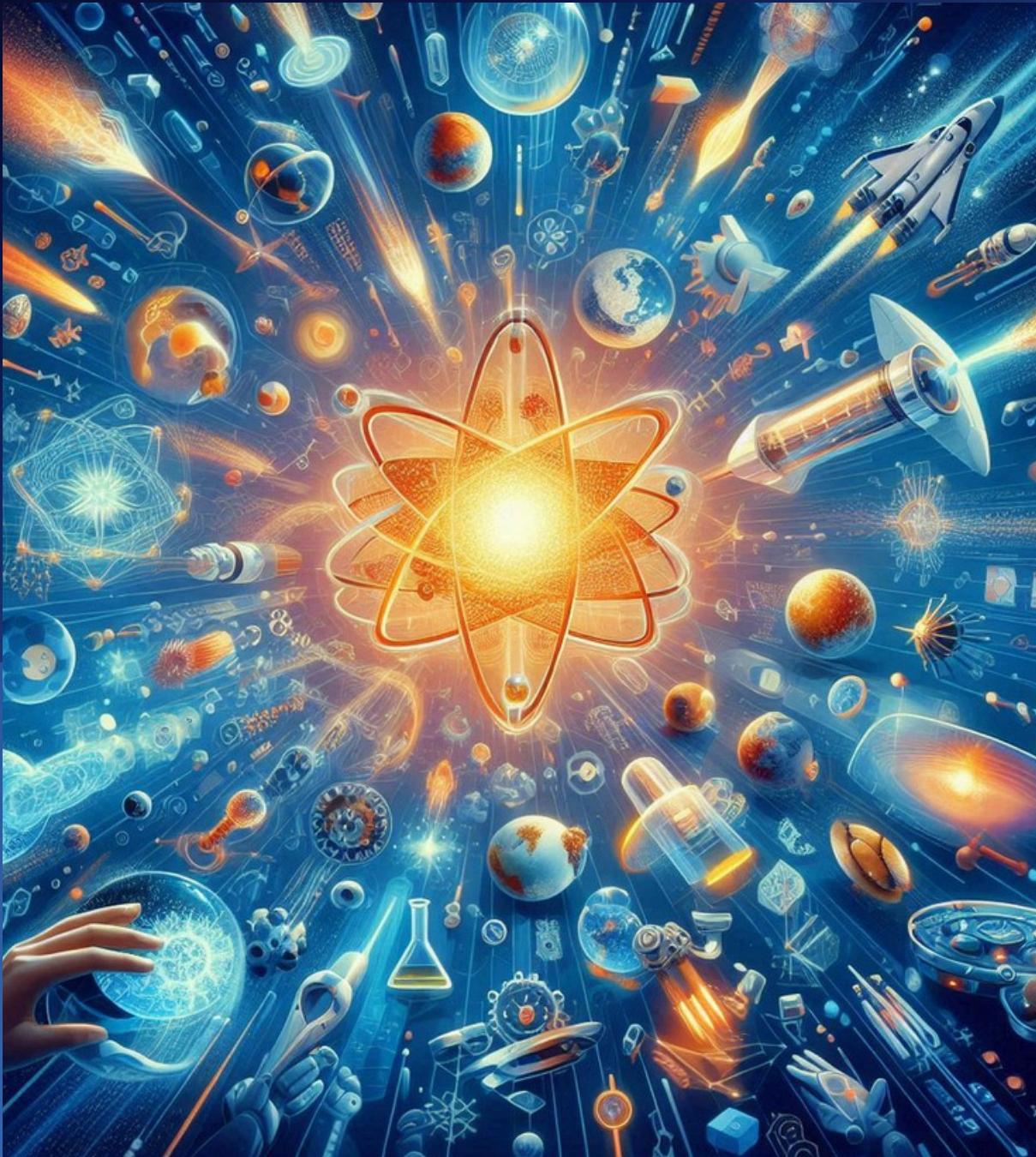


Post AGI World

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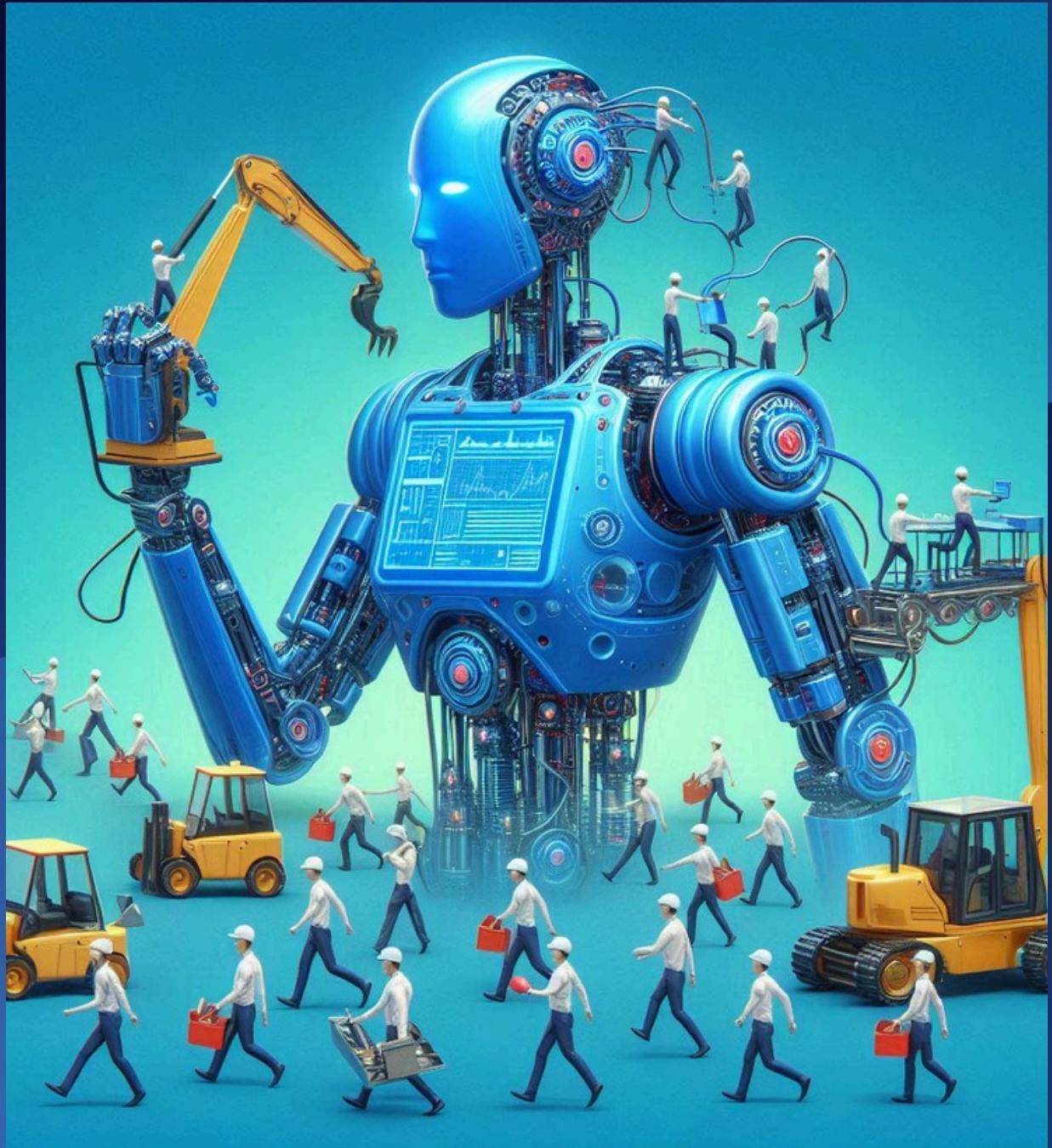
Unprecedented Progress



With AGI, humanity could experience an explosion of progress in various fields like medicine, science, technology, and more. AGI could accelerate research and development processes, leading to breakthroughs that were previously unimaginable.



Automation and Job Displacement



AGI could automate many tasks currently performed by humans, leading to significant job displacement. This could necessitate societal changes such as universal basic income or retraining programs to ensure people can adapt to the new economic landscape.



Enhanced Problem-Solving



AGI's ability to process vast amounts of data and make complex decisions could help solve some of humanity's most pressing issues, such as climate change, disease eradication, and poverty.

Social Dynamics



A post-AGI world could see significant shifts in social dynamics, as individuals and societies adapt to new technologies and ways of living. This could include changes in interpersonal relationships, governance structures, and cultural norms.

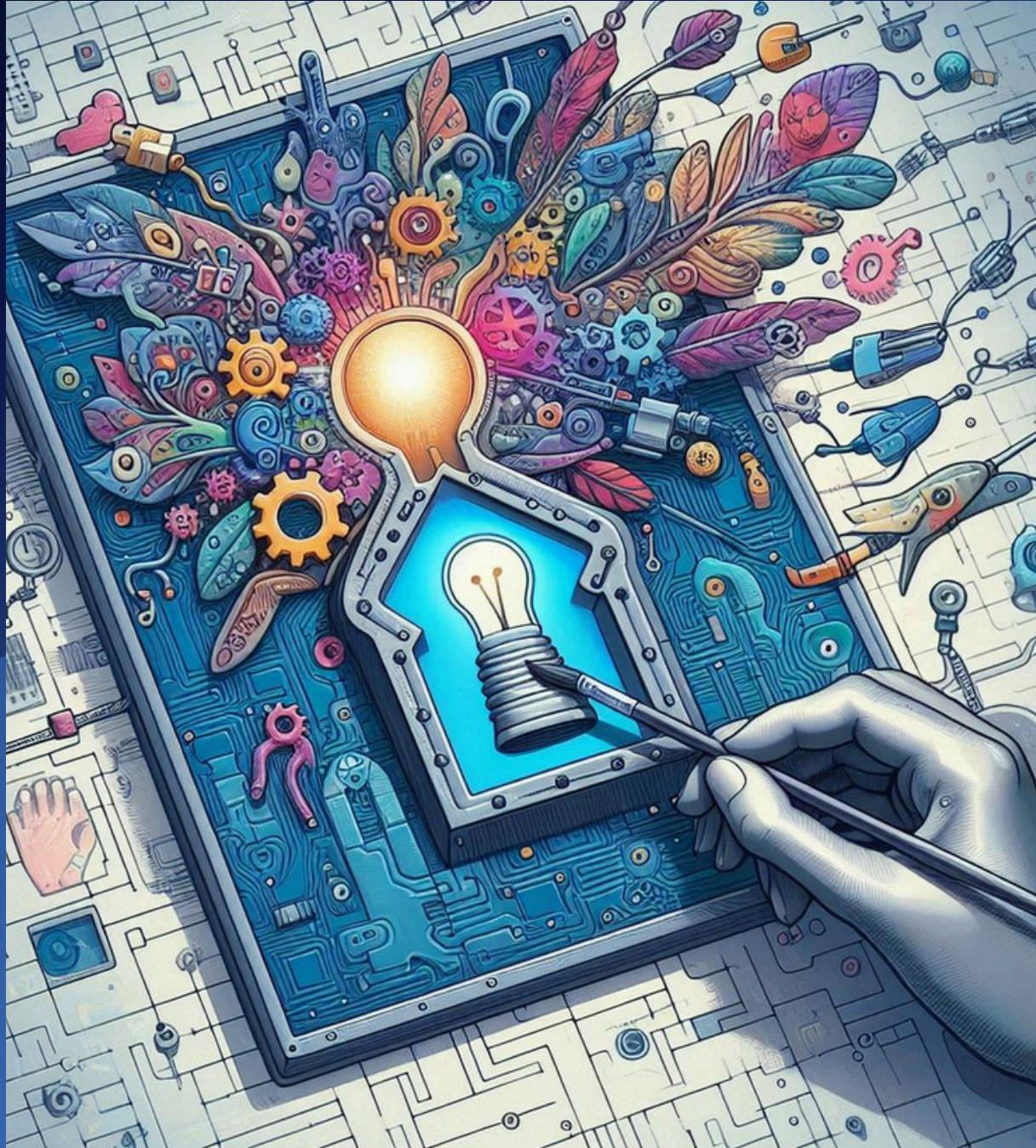


Potential Risks



Despite its potential benefits, AGI also poses significant risks, including the potential for unintended consequences, misuse, or even existential threats if AGI surpasses human control. Safeguards and regulations would be crucial to mitigate these risks.

New Opportunities:



AGI could unlock new opportunities for exploration, creativity, and personal fulfillment. With mundane tasks automated, humans could focus on more meaningful pursuits such as artistic endeavors, philosophical exploration, and personal development.



Post AGI Economics



Job Market Change



AGI will transform job markets, automating tasks, displacing some roles, and creating new ones, necessitating reskilling and adaptation.

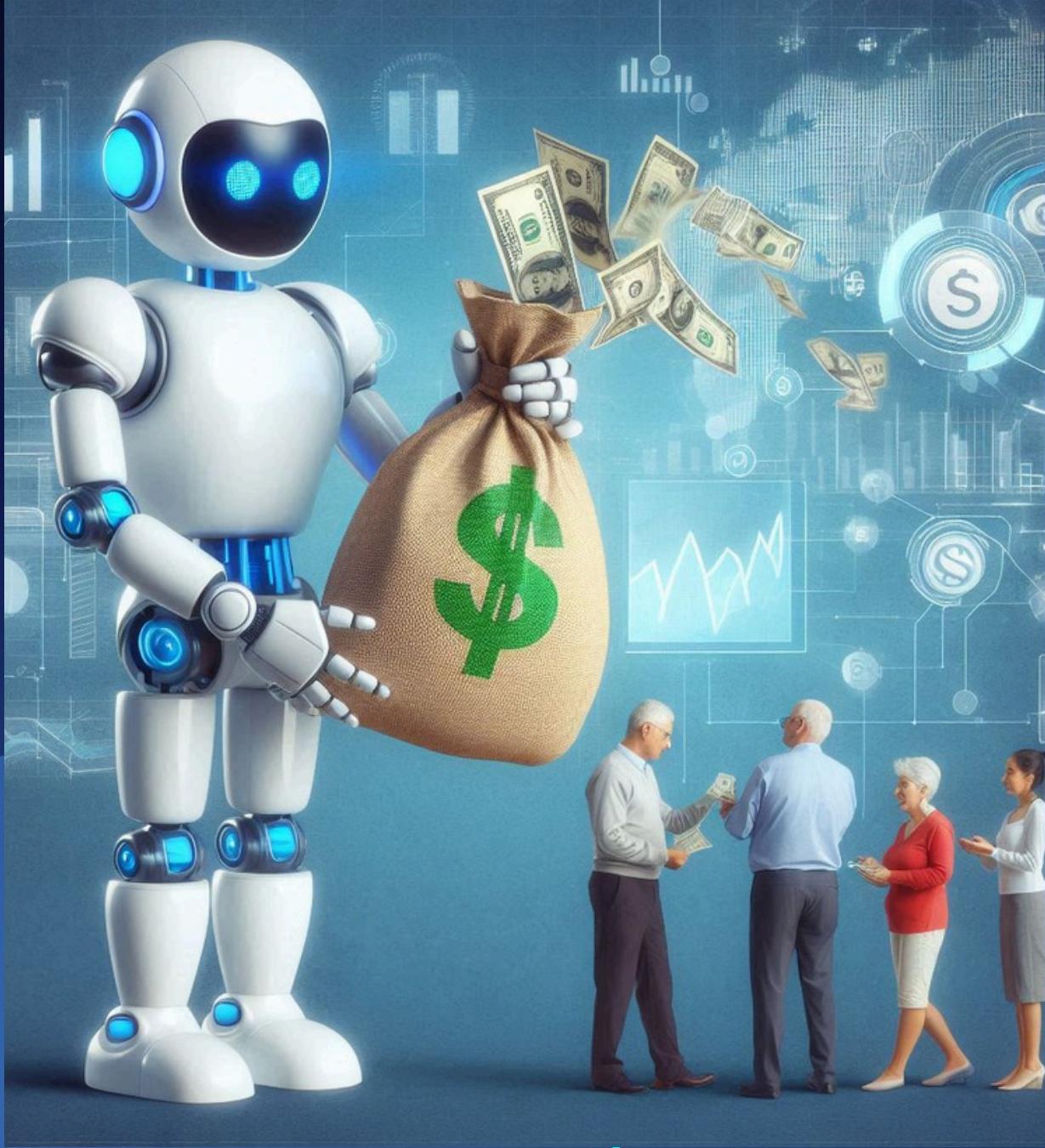


Economic model



Traditional economic models may shift, with increased emphasis on productivity and efficiency driven by AGI, impacting labor, capital, and resource allocation.

Income Distribution



AGI could exacerbate income inequality, with benefits accruing to those who control AGI technologies, while others may face job displacement and wage stagnation.

Consumer Spending



Changes in employment and income distribution could alter consumer spending patterns, with increased demand for AGI-related services and reduced spending on labor-intensive products.



Social Stability



The displacement of jobs and shifts in income may challenge social stability, requiring policies to manage transitions and ensure equitable access to AGI benefits.

Economic Growth and Innovation



AGI will likely drive significant economic growth and innovation, unlocking new industries, enhancing productivity, and fostering advancements in technology and services.



UNIVERSAL BASIC INCOME

- **Economic Stability:** UBI could provide a financial safety net, ensuring that everyone has access to basic necessities regardless of employment status.
- **Redistribution of Wealth:** UBI could serve as a means to redistribute this wealth more evenly across society, reducing economic inequality and ensuring that the benefits of technological advancements are shared broadly.
- **Support for transition:** UBI supports transition in an AGI-transformed job market by providing financial aid, enabling people to pursue education and training without job pressure.

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What is Artificial Intelligence Tax?

- Artificial Intelligence tax could be levied on companies and organization where there is massive job loss due to transformation of work done by humans to AI.
- It could be used to fund schemes like Universal Basic Income



What is Gig Economy?

- The **gig economy** is a labor market characterized by the prevalence of short-term contracts or freelance work, as opposed to permanent jobs.
- **Gig economy is rising and companies don't want to hire on full time roles**
- **Even Government is hiring more people on contractual basis.**

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Thank you!

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